APPENDIX

Dynamic Modelling and Control Design of a Pediatric Robotic Lower-Limb Exoskeleton

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Date: September 2023 For the right leg of a coupled human-exoskeleton system with 5 DOFs, the inertia matrix M(q), Coriolis and centripetal matrix $C(q, \dot{q})$, gravity vector G(q), and torque vector τ are provided below:

A. INERTIA MATRIX (M(q))

$$M(q) = \begin{bmatrix} M_{11} & M_{12} & M_{13} & M_{14} & M_{15} \\ M_{21} & M_{22} & M_{23} & M_{24} & M_{25} \\ M_{31} & M_{32} & M_{33} & M_{34} & M_{35} \\ M_{41} & M_{42} & M_{43} & M_{44} & M_{45} \\ M_{51} & M_{52} & M_{53} & M_{54} & M_{55} \end{bmatrix}$$
(A1)

where

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M_{11} = I_{\text{yy},1} + I_{\text{zz},2} + I_{\text{zz},3} + I_{\text{zz},4} + I_{\text{zz},5} + 0.25\,a_1^2\,m_1 + a_1^2\,m_2 + a_1^2\,m_3 + 0.25\,a_2^2\,m_2 + a_1^2\,m_4 + a_2^2\,m_3 + a_1^2\,m_5 + a_2^2\,m_4 + 0.25\,a_3^2\,m_3 + a_2^2\,m_5 + a_3^2\,m_4 + a_3^2\,m_5 + 0.25\,a_4^2\,m_4 + a_4^2\,m_5 + 0.25\,a_5^2\,m_5 + 1c_{2,1}^2\,m_2 + 1c_{2,2}^2\,m_2 + 1c_{3,1}^2\,m_3 + 1c_{3,2}^2\,m_3 + 1c_{4,1}^2\,m_4 + 1c_{4,2}^2\,m_4 + 1c_{5,1}^2\,m_5 + 1c_{5,2}^2\,m_5 + 1c_1^2\,m_1 + 1c_3^2\,m_1 + I_{\text{xx},2}\cos\left(\theta_2\right)^2 + I_{\text{yy},4}\cos\left(\theta_2\right)^2 + I_{\text{yy},5}\cos\left(\theta_2\right)^2 - I_{\text{zz},3}\cos\left(\theta_2\right)^2 - I_{\text{zz},3}\cos\left(\theta_2\right)^2 - I_{\text{zz},3}\cos\left(\theta_2\right)^2 + I_{\text{yy},5}\cos\left(\theta_2\right)^2 + I_{\text{yy},5}\cos\left(\theta_2\right)^2 + I_{\text{yy},5}\cos\left(\theta_2\right)^2 + I_{\text{zz},3}\cos\left(\theta_2\right)^2 + I_{\text{zz},3}\cos\left(
           I_{\text{zz},4}\cos(\theta_2)^2 - I_{\text{zz},5}\cos(\theta_2)^2 - I_{\text{xx},3}\cos(\theta_2)^2\cos(\theta_3)^2 + I_{\text{xx},4}\cos(\theta_2)^2\cos(\theta_3)^2 + I_{\text{xx},4}\cos(\theta_3)^2 + I_{\text{xx},4}\cos(\theta_3
           I_{\text{xx},5}\cos{(\theta_2)}^2\cos{(\theta_3)}^2 + I_{\text{xx},5}\cos{(\theta_2)}^2\cos{(\theta_4)}^2 + I_{\text{xx},5}\cos{(\theta_2)}^2\cos{(\theta_5)}^2 + I_{\text{vv},3}\cos{(\theta_2)}^2\cos{(\theta_3)}^2 - I_{\text{vv},4}\cos{(\theta_2)}^2\cos{(\theta_3)}^2 - I_{\text{vv},4}\cos{(\theta_2)}^2\cos{(\theta_3)}^2 + I_{\text{xx},5}\cos{(\theta_2)}^2\cos{(\theta_3)}^2 + I_{\text{xx},5}\cos{(\theta_3)}^2 + I_{\text{xx},5}\cos{(\theta_3)}^
           I_{\text{vv},4}\cos(\theta_2)^2\cos(\theta_4)^2 - I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)^2 - I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_4)^2 - I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)^2 + I_{\text{xz},2}\cos(\theta_2)^2\sin(\theta_2) + I_{\text{vv},4}\cos(\theta_2)^2\cos(\theta_3)^2 - I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)^2 - I_{\text{vv},5}\cos(\theta_3)^2 - I_{\text{vv},5}\cos(\theta
           a_2 \log_{1.1} m_2 + a_3 \log_{1.1} m_3 + a_4 \log_{1.1} m_4 + a_5 \log_{1.1} m_5 + a_1 \log_{1.1} m_1 - 0.25 a_2^2 m_2 \cos(\theta_2)^2 - a_2^2 m_3 \cos(\theta_2)^
           a_{2}^{2} m_{4} \cos (\theta_{2})^{2} - 0.25 a_{3}^{2} m_{3} \cos (\theta_{2})^{2} - a_{2}^{2} m_{5} \cos (\theta_{2})^{2} - a_{3}^{2} m_{4} \cos (\theta_{2})^{2} - a_{3}^{2} m_{5} \cos (\theta_{2})^{2} - \ln (2a_{1}^{2} m_{2} \cos (\theta_{2})^{2} + a_{2}^{2} m_{3}^{2} \cos (\theta_{2})^{2} + a_{3}^{2} m_{5} \cos (\theta_{2})^{2} - \ln (2a_{1}^{2} m_{2} \cos (\theta_{2})^{2} + a_{3}^{2} m_{5}^{2} \cos (\theta_{2})^{2} + a_{3}^{2} m_{5}^{2} \cos (\theta_{2})^{2} + a_{3}^{2} m_{5}^{2} \cos (\theta_{2})^{2} + a_{5}^{2} m
           {{{{| {\rm lc}_{2,3}}^2 m_2 \cos \left( {\theta _2} \right)^2 - {\rm lc}_{3,1}}^2 m_3 \cos \left( {\theta _2} \right)^2 + {{{\rm lc}_{3,3}}^2 m_3 \cos \left( {\theta _2} \right)^2 - {{\rm lc}_{4,2}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 - {{\rm lc}_{4,2}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 - {{\rm lc}_{4,2}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 - {{\rm lc}_{4,2}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 + {{\rm lc}_{4,3}}^2 m_4 \cos \left( {\theta _2} \right)^2 +
           {{{\rm lc}_{5,2}}^{2}}m_{5}\cos \left( {{\theta _{2}}} \right)^{2} + {{\rm lc}_{5,3}}^{2}m_{5}\cos \left( {{\theta _{2}}} \right)^{2} + {{\rm lc}_{3,1}}^{2}m_{3}\cos \left( {{\theta _{2}}} \right)^{2}\cos \left( {{\theta _{3}}} \right)^{2} - {{\rm lc}_{3,2}}^{2}m_{3}\cos \left( {{\theta _{2}}} \right)^{2}\cos \left( {{\theta _{3}}} \right)^{2} - {{\rm lc}_{4,1}}^{2}m_{4}\cos \left( {{\theta _{2}}} \right)^{2}\cos \left( {{\theta _{3}}} \right)^{2} - {{\rm lc}_{4,1}}^{2}m_{4}\cos \left( {{\theta _{2}}} \right)^{2}\cos \left( {{\theta _{3}}} \right)^{2} + {{\rm lc}_{5,3}}^{2}m_{5}\cos \left( {{\theta _{2}}} \right)^{2}\sin \left( {{\theta _{2}}} \right)^{2}\cos \left( {{\theta _{3}}} \right)^{2} + {{\rm lc}_{5,3}}^{2}m_{5}\cos \left( {{\theta _{2}}} \right)^{2}\sin \left( {{\theta _{2}}} \right)^{2}\cos \left( {{\theta _{3}}} \right)^{2} + {{\rm lc}_{5,3}}^{2}m_{5}\cos \left( {{\theta _{2}}} \right)^{2}\sin \left( {{
           \frac{1}{\log_{1}^{2}} \frac{2}{m_{5}} \cos(\theta_{2})^{2} \cos(\theta_{4})^{2} + \log_{1}^{2} \frac{2}{m_{5}} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} - \log_{1}^{2} \frac{2}{m_{5}} \cos(\theta_{2})^{2} \cos(\theta_{5})^{2} + \log_{1}^{2} \frac{2}{m_{5}} \cos(\theta_{2})^{2} \cos(\theta_{4})^{2} + \log_{1}^{2} \frac{2}{m_{5}} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} + \log_{1}^{2} \frac{2}{m_{5}} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} + \log_{1}^{2} \frac{2}{m_{5}} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} + \log_{1}^{2} \frac{2}{m_{5}} \cos
           lc_{5,2}^2 m_5 \cos(\theta_2)^2 \cos(\theta_5)^2 + 2I_{vz,3} \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) - 2I_{xx,4} \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 - 2I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 - 2I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 - 2I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_
           2I_{xx} = \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 2I_{xx} = \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2I_{yy} = \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2I_{yy} = \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2I_{yy} = \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2I_{yy} = \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2I_{yy} = \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2I_{yy} = \cos(\theta_5)^2 
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           2I_{xz,3}\cos(\theta_2)\sin(\theta_2)\sin(\theta_3) + a_3a_4m_4\cos(\theta_4) + 2a_3a_4m_5\cos(\theta_4) + 2a_1lc_{2,3}m_2\cos(\theta_2) + 2a_1lc_{3,3}m_3\cos(\theta_2) + a_3a_4m_5\cos(\theta_4) + a_3a_5m_5\cos(\theta_4) + a_3
               2 a_2 \log_{3} 2 m_3 \cos(\theta_3) + 2 a_1 \log_{3} m_4 \cos(\theta_2) + 2 a_3 \log_{4} 1 m_4 \cos(\theta_4) + 2 a_1 \log_{3} m_5 \cos(\theta_2) - 2 a_4 \log_{3} m_5 \cos(\theta_5) - 2 a_4 \log_{3} m_5 \cos(\theta_5)
               a_1 a_2 m_2 \sin(\theta_2) - 2 a_1 a_2 m_3 \sin(\theta_2) - 2 a_1 a_2 m_4 \sin(\theta_2) - 2 a_1 a_2 m_5 \sin(\theta_2) + a_2 a_3 m_3 \sin(\theta_3) + a_2 a_3 m_5 \sin(\theta_3) + a_3 a_3 \cos(\theta_3) + a_3 a_3 
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           2I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)\sin(\theta_3) - 2I_{xy,4}\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_4) - 2I_{xy,5}\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_4) - 2I_{xy,5}\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_4)
           2I_{xy.5}\cos(\theta_2)^2\cos(\theta_5)\sin(\theta_5) - a_2\log_{10}m_2\cos(\theta_2)^2 - a_3\log_{11}m_3\cos(\theta_2)^2 + 0.25a_3^2m_3\cos(\theta_2)^2\cos(\theta_3)^2 + 0.25a_3^2m_3\cos(\theta_2)^2 + 0.25a_3^2m_3^2\cos(\theta_2)^2 + 0.25a_3^2
           a_{3}^{2} m_{4} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} + a_{3}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} - 0.25 a_{4}^{2} m_{4} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} - 0.25 a_{4}^{2} m_{4} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} - 0.25 a_{4}^{2} m_{4} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} - 0.25 a_{4}^{2} m_{5} \cos (\theta_{3})^{2} - 0.25 a_{4}^{2} m_{5} \cos (\theta_{3})^{2} + 0.25 a_{5}^{2} \cos (\theta_
           a_4^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 - a_4^2 m_5 \cos(\theta_2)^2 \cos(\theta_4)^2 - 0.25 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 - 0.25 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_4)^2 - 0.25 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 - 0.25 a_5^2 m_5 \cos(\theta_3)^2 - 0.25 a_5^2 m_5 \cos(\theta_3)^2 - 0.25 a_5^2 m_5 \cos(\theta_3)^2 \cos(\theta_3)^
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a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 - a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_4)^2 - a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_5)^2 + 2 I_{vz,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 2 I_{vz,4} \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 2 I_{vz,4} \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4
    2I_{xz,4}\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)+2I_{xz,4}\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)+0.5a_4^2m_4\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)^2+
2 a_4^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 + 0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_
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2 \operatorname{lc}_{4,2}{}^{2} m_{4} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} + 2 \operatorname{lc}_{5,1}{}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} + 2 \operatorname{lc}_{5,1}{}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} - 2 \operatorname{lc}_{5,1}{}^{2} m_{5} \cos (\theta_{5})^{2} \cos 
2 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})^{2}} + 2 \log_{5,1}^{2} m_{5} \cos{(\theta_{2})^{2}} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} - 2 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})^{2}} - 2 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})^{2}} - 2 \log_{5,2}^{2} m_{5} \cos{(\theta_{5})^{2}} \cos
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    a_2 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + a_2 a_4 m_4 \cos(\theta_4) \sin(\theta_3) + 2 a_2 a_4 m_5 \cos(\theta_3) \sin(\theta_4) + 2 a_2 a_4 m_5 \cos(\theta_4) \sin(\theta_3) - a_3 a_4 m_4 \cos(\theta_4) \sin(\theta_4) + a_4 a_5 \cos(\theta_4) \sin(\theta_4) + a_5 a_5 \cos(\theta_4) \sin(\theta_4) + a_5 a_5 \cos(\theta_4) \sin(\theta_4) + a_5 \cos(\theta_4) \sin(\theta_5) + a_5 \cos(\theta_5) \cos(\theta_5)
    a_3 a_5 m_5 \cos(\theta_4) \sin(\theta_5) - a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_4) - a_2 \ln_{2,3} m_2 \cos(\theta_2) \sin(\theta_2) - 2 a_1 \ln_{3,2} m_3 \cos(\theta_3) \sin(\theta_2) - 2 a_1 \ln_{3,2} m_3 \cos(\theta_3) \sin(\theta_2) - 2 a_2 \ln_{3,2} m_3 \cos(\theta_3) \sin(\theta_4) - 2 a_2 \ln_{3,2} m_3 \cos(\theta_3) \sin(\theta_4) - 2 a_2 \ln_{3,2} m_3 \cos(\theta_3) \sin(\theta_4) - 2 a_3 \ln_{3,2} m_3 \cos(\theta_3) \sin(\theta_4) - 2 a_4 \ln_{3,2} m_3 \cos(\theta_4) \cos(\theta_5) \cos(\theta_
2 a_2 \log_{3.3} m_3 \cos(\theta_2) \sin(\theta_2) - 2 a_2 \log_{4.3} m_4 \cos(\theta_2) \sin(\theta_2) + 2 a_2 \log_{4.1} m_4 \cos(\theta_3) \sin(\theta_4) + 2 a_2 \log_{4.1} m_4 \cos(\theta_4) \sin(\theta_3) - 2 \log_{4.3} m_4 \cos(\theta_4) \sin(\theta_4) + 2 \log_{4.3} m_4 \cos(\theta_4) \cos(\theta
2 a_2 \ln_{5.3} m_5 \cos(\theta_2) \sin(\theta_2) - 2 a_3 \ln_{5.1} m_5 \cos(\theta_4) \sin(\theta_5) - 2 a_3 \ln_{5.1} m_5 \cos(\theta_5) \sin(\theta_4) - a_1 a_3 m_3 \sin(\theta_2) \sin(\theta_3) - a_1 a_2 \sin(\theta_3) - a_2 \sin(\theta_3) \sin(\theta_3) - a_3 \sin(\theta_3) \sin(\theta_3) - a_3 \sin(\theta_3) \sin(\theta_3) - a_3 \sin(\theta_3) \sin(\theta_3) - a_3 \sin(\theta_3) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) - a_3 \sin(\theta_3) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_3) \cos
2 a_2 \log_{4.2} m_4 \sin(\theta_3) \sin(\theta_4) + 2 a_3 \log_{5.2} m_5 \sin(\theta_4) \sin(\theta_5) + 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 -
4I_{\text{vv.5}}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)^2 - a_3 a_4 m_4 \cos(\theta_2)^2\cos(\theta_4) - 2a_3 a_4 m_5 \cos(\theta_2)^2\cos(\theta_4) - a_3 a_4 m_5 \cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4) - a_3 a_4 m_5 \cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos
2 a_2 \log_{3,2} m_3 \cos(\theta_2)^2 \cos(\theta_3) - 2 a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_4) - a_2 a_3 m_3 \cos(\theta_2)^2 \sin(\theta_3) - 2 a_2 a_3 m_4 \cos(\theta_2)^2 \sin(\theta_3) - a_2 \log_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_4) - a_2 \log_{4,1} m_4 \cos(\theta_2)^2 \sin(\theta_3) - a_2 \log_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_4) - a_2 \log_{4,1} m_4 \cos(\theta_2)^2 \sin(\theta_3) - a_2 \log_{4,1} m_4 \cos(\theta_2)^2 \sin(\theta_3) - a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_4) - a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \sin(\theta_3) - a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_4) - a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \sin(\theta_3) - a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_4) - a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \sin(\theta_3) - a_3 \log_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_4) - a_3 \log_{4,1} m_4 \cos(\theta_4) - a_3 \log_{4,1} m_4 \cos(\theta_4) - a_4 
2 a_2 a_3 m_5 \cos(\theta_2)^2 \sin(\theta_3) - 2 a_2 \log_{11} m_3 \cos(\theta_2)^2 \sin(\theta_3) + 2 a_3 \log_{12} m_4 \cos(\theta_2)^2 \sin(\theta_4) + 4 I_{xy,4} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2 a_3 \log_{12} m_4 \cos(\theta_2)^2 \sin(\theta_3) + 4 \log_{12} m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) + 4 \log_{12} m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) + 4 \log_{12} m_4 \cos(\theta_2)^2 \sin(\theta_3) + 4 \log_{12} m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) + 4 \log_{12} m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) + 4 \log_{12} m_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + 4 \log_{12} m_4 \cos(\theta_3) \cos(\theta
4I_{xy,4}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\sin(\theta_4)+4I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)+4I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_3)^2\sin(\theta_3)+
4I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\sin(\theta_4)+4I_{xy,5}\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4)+4I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5)+
4I_{xy,5}\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - 8I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_3) - 8I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - 8I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_3) - 8I_{xy,5}\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos
8I_{xy,5}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - 2I_{xz,5}\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5) - 2I_{xz,5}\cos(\theta_2)\cos(\theta_4)\sin(\theta_5) - 2I_{xz,5}\cos(\theta_2)\sin(\theta_5) - 2I_{xz,5}\cos(\theta_2)\sin(\theta_3)\sin(\theta_5) - 2I_{xz,5}\cos(\theta_2)\sin(\theta_3)\sin(\theta_5) - 2I_{xz,5}\cos(\theta_3)\sin(\theta_3)\sin(\theta_5) - 2I_{xz,5}\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin
2I_{xz,5}\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4) + a_2a_5m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + 2I_{yz,5}\cos(\theta_2)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + a_2a_5m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + a_3a_5m_5\cos(\theta_5)\sin(\theta_5) + a_3a_5m_5\cos(\theta_5)\cos(\theta_5)\sin(\theta_5) + a_3a_5m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\sin(\theta_5)\sin(\theta_5) + a_3a_5m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\sin(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\sin(\theta_5)\cos(\theta_5)\cos(\theta_5)\sin(\theta_5)\sin(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos
    2 a_2 \operatorname{lc}_{5,1} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2 a_1 \operatorname{lc}_{4,2} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 2 a_2 \operatorname{lc}_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 2 a_2 \operatorname{lc}_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 2 a_2 \operatorname{lc}_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) - 2 a_3 \operatorname{lc}_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) - 2 a_3 \operatorname{lc}_{5,2} m_5 \cos(\theta_5) \cos(
2 a_2 \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 2 a_2 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) - a_1 \log_{10} \sin(\theta_4) \sin(\theta_4) - a_2 \log_{10} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
    a_1 a_4 m_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 2 a_1 a_4 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 2 a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 2 a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta
a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_5) - a_3 a_5 \cos(\theta_5) \sin(\theta_5) - a_4 a_5 \cos(\theta_5) \sin(\theta_5) - a_5 \cos(\theta_5) \cos(\theta
2 \log_{3.2} \log_{3.3} m_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) + 2 a_4 \log_{4.1} m_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2 a_5 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 + 2 \log_{1.1} m_5 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \cos(
2 a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2 a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - a_3 \log_{10} m_5 \cos(\theta_2) \sin(\theta_3) - a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2 a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)
    2 a_1 \operatorname{lc}_{4,1} m_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 2 a_1 \operatorname{lc}_{4,1} m_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 2 a_3 \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \sin(\theta_2) \sin(\theta_3) - 2 a_3 \operatorname{lc}_{4,3} m_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) - 2 a_3 \operatorname{lc}_{4,3} m_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) - 2 a_3 \operatorname{lc}_{4,3} m_4 \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
    2 a_3 \operatorname{lc}_{5,3} m_5 \cos(\theta_2) \sin(\theta_2) \sin(\theta_3) - 2 a_2 \operatorname{lc}_{5,1} m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 2 a_2 \operatorname{lc}_{5,1} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 2 a_2 \operatorname{lc}_{5,1} m_5 \cos(\theta_4) \sin(\theta_5) - 2 a_2 \operatorname{lc}_{5,1} m_5 \cos(\theta_4) \sin(\theta_5) - 2 a_3 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \cos(\theta_
2 a_2 \ln \ln m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 2 \ln \ln \ln m_5 \cos(\theta_2) \sin(\theta_2) \sin(\theta_3) + 2 \ln \ln m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 2 \ln \ln m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_
2 a_2 \log_{5.2} m_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2 I_{xx,4} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) + 2 I_{xx,4} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2 I_{xx,4} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 2 I_{xx,5} \cos(\theta_5) \cos(\theta_5) + 2 I_{xx,5} \cos(\theta_5) \cos(
2I_{xx,5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5) + 2I_{xx,5}\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5) - 2I_{yy,4}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{yy,4}\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\cos(\theta_4)\cos(\theta_5)\cos(\theta_5)\cos(\theta_4)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta
2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\sin(\theta_3)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\sin(\theta_3)\sin(\theta_5) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) - 2I_{\text{vv},5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(
a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4 \ln_{5,1}^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4 \ln_{5,2}^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4 \ln_{5,1}^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4 \ln_{5,1}^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 
2a_{2} lc_{4,2} m_{4} cos(\theta_{2})^{2} cos(\theta_{3}) cos(\theta_{4}) + 2a_{3} lc_{5,2} m_{5} cos(\theta_{2})^{2} cos(\theta_{4}) cos(\theta_{5}) - a_{2} a_{4} m_{4} cos(\theta_{2})^{2} cos(\theta_{3}) sin(\theta_{4}) - a_{3} lc_{5,2} m_{5} cos(\theta_{2})^{2} cos(\theta_{3}) cos
a_2 a_4 m_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_3) - 2 a_2 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) - 2 a_2 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_3) + 2 a_2 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) - 2 a_2 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_2 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_2 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_2 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_6) \cos(\theta
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a_3 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_5) + a_3 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_4) - a_3 \log_{12} m_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - a_3 \log_{12} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3)
2 a_2 \operatorname{lc}_{4,1} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_4) - 2 a_2 \operatorname{lc}_{4,1} m_4 \cos (\theta_2)^2 \cos (\theta_4) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + a_4 \operatorname{lc}_{4,2} m_4 \cos (\theta_3) \cos (\theta_4) \cos (\theta_3) \cos (\theta
a_4 \log_{10} \log_{10} a_4 \log_{10} \log_{10} a_4 \log_{10} \log_{10} a_4 \log_{10} a_4 \log_{10} a_4 \log_{10} a_4 \log_{10} a_4 \log_{10}
a_5 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{10} 2 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{10} 2 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) - a_5 \log_{10} 2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
2 \log_{3.1} \log_{3.2} m_3 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_4) \sin (\theta_4) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_4) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_4) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.1} \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{4.2} m_4 \cos (\theta_3) \cos 
2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_4) \sin (\theta_4) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_5) \sin (\theta_5) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{12} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} \log_{11} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} m_5 \cos (\theta_2)^2 \cos (\theta_3) \sin (\theta_3) + 2 \log_{11} m_5 \cos (\theta_3) \cos (\theta_
2 a_2 \log_{4.2} m_4 \cos(\theta_2)^2 \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5.2} m_5 \cos(\theta_2)^2 \sin(\theta_4) \sin(\theta_5) + a_3 a_4 m_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) + a_5 \log_{10} m_4 \cos(\theta_2)^2 \sin(\theta_3) \sin(\theta_4) - a_5 \log_{10} m_5 \cos(\theta_2)^2 \sin(\theta_4) \sin(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) + a_5 \log_{10} m_5 \cos(\theta_2)^2 \sin(\theta_3) \sin(\theta_4) - a_5 \log_{10} m_5 \cos(\theta_2)^2 \sin(\theta_3) \sin(\theta_4) - a_5 \log_{10} m_5 \cos(\theta_2)^2 \sin(\theta_3) \sin(\theta_4) + a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)
2 a_3 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) + 2 a_3 \log_{10}(\theta_4) + 2 \log_{10}(\theta_4) +
2 a_4 \log_{10} 2 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) + a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \sin(\theta_5) + a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \sin(\theta_5) + a_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \sin(\theta_5) + a_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \sin(\theta_5) + a_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_5) + a_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_5) + a_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5) + a_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \sin(\theta_5) + a_5 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5) + a_5 \cos(\theta_5)^2 \cos(\theta_5) + a_5 \cos(\theta_5)^2 \cos(\theta_5)^
2I_{xz,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2) - 2a_3l_{2,2}m_4\cos(\theta_2)^2\cos(\theta_3)^2\sin(\theta_4) + 2a_4l_{2,1}m_5\cos(\theta_2)^2\cos(\theta_3)^2\sin(\theta_5) + 2a_4l_{2,2}m_5\cos(\theta_4)\cos(\theta_5)\sin(\theta_5) + 2a_4l_{2,2}m_5\cos(\theta_5)\sin(\theta_5) + 2a_4l_{2,2}m_5\cos(\theta_5)\cos(\theta_5)\sin(\theta_5) + 2a_4l_{2,2}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + 2a_4l_{2,2}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + 2a_4l_{2,2}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + 2a_4l_{2,2}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(
    2 a_4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \sin(\theta_5) - 2 I_{vz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 2 I_{vz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 2 I_{vz,5} \cos(\theta_4) \sin(\theta_5) - 2 I_{vz,5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2 I_{vz,5} \cos(\theta_5) \cos(
2I_{vz,5}\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3) - 2a_1lc_{5,1}m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2) - 2lc_{4,2}lc_{4,3}m_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_2) - 2lc_{4,2}lc_{4,3}m_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_
4a_4 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) - a_4 \log_{4.3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - a_4 \log_{4.3} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + a_4 \log_{4.3} m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - a_4 \log_{4.3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{4.3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_
2 a_1 \log_{10} a_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 2 a_1 \log_{10} a_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 2 a_1 \log_{10} a_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 2 a_1 \log_{10} a_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2 a_1 \log_{10} a_2 \cos(\theta_5) \cos(
2 a_4 \log_{3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 2 a_4 \log_{3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2 a_4 \log_{3} m_5 \cos(\theta_4) \cos(\theta_4)
a_1 a_5 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_5) + a_1 a_5 m_5 \cos(\theta_5) \cos(
2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 4 a_4 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 4 a_4 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 4 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 4 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 2 \operatorname{lc}_{4,1} \operatorname{lc}_{4,3} m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(
2 a_1 \operatorname{lc}_{5,1} m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 2 a_1 \operatorname{lc}_{5,1} m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 2 a_1 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 2 a_1 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) + 2 a_1 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2 a_1 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \cos(
2 \log_{4,2} \log_{4,3} m_4 \cos(\theta_2) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 2 \log_{10} \log_{10} (\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_{10} (\theta_4) \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2 \log_{10} (\theta_4) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
2a_4^2m_5\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_2)^2\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_4)\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_4)\cos(\theta_4)\sin(\theta_4) - 0.5a_5^2m_5\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta
0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_3) \cos(\theta_
a_2 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2 \log_{10}^2 m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{10}^2 m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 \log_{10}^2 m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2 \log_{10}^2 m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_
2 \log_{11}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_4) \sin(\theta_4) + 2 \log_{12}^{2} m_5 \cos(\theta_5) \cos(\theta
2 \log_{5.1}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2 \log_{5.2}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2 \log_{5.1}^{2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 2 \log_{5.2}^{2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 2 \log_{5.2}^{2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2 \log_{5.2}^{2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2 \log_{5.2}^{2} m_5 \cos(\theta_5) \cos(\theta
2 \log_{5,1}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{4}) \cos (\theta_{5}) \sin (\theta_{4}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{4}) \cos (\theta_{5}) \sin (\theta_{4}) \sin (\theta_{5}) - 2 \log_{5,2}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{4}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{4}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{2})^{2} \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) + 2 \log_{5,2}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta
2 a_2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) + a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2 a_3 \log_{4,2} m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2 a_2 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 2 a_2 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) + 2 a_2 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2 a_2 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2 a_2 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2 a_2 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2 a_2 \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2 a_2 \log_{5,2} m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) + 2 a_2 \log_{5,2} m_5 \cos(\theta_5) \cos(\theta
2 a_2 \ln_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 2 a_4 \ln_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) + 2 a_4 \ln_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 \ln_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 2 \ln_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 2 \ln_5 \cos(\theta_3) \cos(\theta_
a_3 a_4 m_4 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_2 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 a_4 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \cos(\theta_5) + a_5 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \cos(\theta_5) + a_5 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \cos(\theta_5) + a_5 a_5 m_5 \cos(\theta_5)^2 \cos(\theta_5) \cos(
a_2 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_2 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 4 a_5 \ln_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 6 \ln_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \cos(\theta_5
    2 a_3 \log_{1.1} m_4 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2 a_2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2 a_2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_5) + 2 a_2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 2 a_2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2 a_2 \log_{1.1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_6) 
2a_{2} lc_{5,1} m_{5} cos(\theta_{2})^{2} cos(\theta_{5}) sin(\theta_{3}) sin(\theta_{4}) - 2a_{4} lc_{5,2} m_{5} cos(\theta_{2})^{2} cos(\theta_{3}) sin(\theta_{3}) sin(\theta_{5}) - 2a_{4} lc_{5,2} m_{5} cos(\theta_{2})^{2} cos(\theta_{4}) sin(\theta_{5}) - 2a_{5} lc_{5,1} lc_{5,2} lc_{5
2 a_2 \log_{5,2} m_5 \cos(\theta_2)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_5)^2 \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 4 I_{xx,5} \cos(\theta_5)^2 \cos(\theta_5)^
4I_{xx,5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)-4I_{xx,5}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)+
4I_{yy.5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_3)\sin(\theta_4) + 4I_{yy.5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_3)\sin(\theta_5) + 4I_{yy.5}\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_5)
4I_{yy.5}\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)-2a_3\log_{5.2}m_5\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)-
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a_3 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) - a_3 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_4) - 2 a_4 \log_{10} a_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_5 \log_{10} a_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_5 \log_{10} a_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_5 \log_{10} a_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_5 \log_{10} \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_5 \log_{10} \cos(\theta_3)^2 \cos(\theta_3)^
    2 a_4 lc_{4,2} m_4 cos(\theta_2)^2 cos(\theta_3)^2 cos(\theta_4) sin(\theta_4) - 2 a_3 lc_{5,1} m_5 cos(\theta_2)^2 cos(\theta_3)^2 cos(\theta_4) sin(\theta_5) - 2 a_3 lc_{5,1} m_5 cos(\theta_2)^2 cos(\theta_3)^2 cos(\theta_4) sin(\theta_4) - 2 a_3 lc_{5,1} m_5 cos(\theta_2)^2 cos(\theta_3)^2 cos(\theta_4) sin(\theta_4) - 2 a_3 lc_{5,1} m_5 cos(\theta_2)^2 cos(\theta_3)^2 cos(\theta_3)^2 cos(\theta_4) sin(\theta_4) - 2 a_3 lc_{5,1} m_5 cos(\theta_2)^2 cos(\theta_3)^2 cos(
    2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(
    2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2 a_5 lc_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2 a_5 lc_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) - 2 a_5 lc_{5,2} m_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2 a_5 lc_{5,2} m_5 \cos(\theta_5)^2 \cos(
    4 \log_{10} \log_{10
    4 \log_{10} \log_{10
    4 \log_{10} \log_{10
    a_1 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_5 \log_{3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_5 \log_{3} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_5 \log_{3} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{3} m_5 \cos(\theta_5) \cos
    a_5 \log_{10} a_5 \log_{10} a_5 \log(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 8 \log_{11} \log_{12} a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 8 \log_{11} \log_{12} a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 8 \log_{11} \log_{12} a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 8 \log_{11} \log_{12} a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 8 \log_{11} \log_{12} a_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_4) + 8 \log_{11} \log_{12} a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
    8 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 8 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 8 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 8 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 8 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 8 \log_{5.2} m_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 8 \log_{5.2} m_5 \cos(\theta_5)^2 \cos(\theta_5)
    2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,3} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,3} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,3} m_5 \cos(\theta_4) \sin(\theta_5) + 2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,2} m_5 \cos(\theta_4) \sin(\theta_5) + 2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,2} m_5 \cos(\theta_4) \sin(\theta_5) + 2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2 \operatorname{lc}_{5,1} \operatorname{lc}_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2 \operatorname{lc}_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2 \operatorname{lc}_{5,2} m_5 \cos(\theta_5) \cos
    2 \log_{11} \log_{12} m_5 \cos{(\theta_2)} \cos{(\theta_2)} \sin{(\theta_2)} \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 2 \log_{12} \log_{12} \log_{12} \cos{(\theta_2)} \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 2 \log_{12} \log_{12} \cos{(\theta_2)} \cos{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 2 \log_{12} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)}
    8I_{xy,5}\cos\left(\theta_{2}\right)^{2}\cos\left(\theta_{3}\right)\cos\left(\theta_{4}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{4}\right)\sin\left(\theta_{5}\right)-a_{3}a_{5}m_{5}\cos\left(\theta_{2}\right)^{2}\cos\left(\theta_{3}\right)\cos\left(\theta_{4}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{3}\right)-a_{5}\sin\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)
    2 a_3 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 2 a_4 l_{4,1} m_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) + 2 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) + 2 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) + 2 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) + 2 a_5 l_{5,1} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) + 2 a_5 l_{5,1} m_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2 a_5 l_{5,1} m_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2 a_5 l_{5,1} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
    2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2 a_3 \log_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
    2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) - 2 a_5 \operatorname{lc}_{5,1} m_5 \cos(\theta_5) \cos(\theta_5)
    2 a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + a_3 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_5) \cos
    2 a_3 \log_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + a_5^2 m_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) \cos(\theta_5)^2 \cos(\theta_5)^2
    a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
4 \log_{10}^{2} \log_{10}^
    4 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
    2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_4) - 2 a_4 a_5 m_5 \cos(\theta_5) \sin(\theta_4) - 2 a_5 a_5 \cos(\theta_5) \cos(\theta
    4 a_4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) - 4 a_4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + \frac{1}{2} \log(\theta_4) \cos(\theta_5) \sin(\theta_4) + \frac{1}{2} \log(\theta_5) \sin(\theta_5) \sin(\theta_5)
    4 a_4 \log_2 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) \sin(\theta_5) + 4 a_4 \log_2 m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) -
         a_5 \log_{5.3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 2 \log_{5.1} \log_{5.3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 2 \log_{5.3} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2 \log_{5.3} m_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(
    2 \lg_{5,2} \lg_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 2 \lg_{5,2} \lg_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 2 \lg_{5,2} \lg_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5)
    2 \log_{1.2} \log_{1.3} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 4 a_5 \log_{1.2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4 a_5 \log_{1.2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) + 4 a_5 \log_{1.2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) + 4 a_5 \log_{1.2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4 a_5 \log_{1.2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4 a_5 \log_{1.2} m_5 \cos(\theta_3)^2 \cos
    4a_5 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4a_5 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4a_5 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4a_5 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4a_5 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 4a_5 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 4a_5 \log_{5.2} m_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 4a_5 \log_{5.2} m_5 \cos(\theta_5)^2 \cos(\theta_5)^2
    4 a_4 \log_{5.2} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) + 2 a_4 a_5 m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) + 2 a_4 a_5 m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
    4 a_4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4 a_5 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4 \log_{10} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4 \log_{10} m_5 \cos(\theta_5) \cos(
    4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4 a_5 l_{5,1} m_5 \cos(\theta_5) \cos(
    4a_5 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8\log_{11} \log_{12} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5)
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(A2)

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M_{12} = I_{xy,4} \cos(\theta_2) - I_{xy,3} \cos(\theta_2) - I_{xy,2} \cos(\theta_2) + I_{xy,5} \cos(\theta_2) - I_{yz,2} \sin(\theta_2) + I_{xz,3} \cos(\theta_3) \sin(\theta_2) - I_{xy,3} \cos(\theta_3) \sin(\theta_3) - I_{xy,4} \cos(\theta_3) \sin(\theta_3) - I_{xy,5} \cos(\theta_3) \cos(\theta_3) - I_{xy,5} \cos(\theta_3) \cos(\theta
        I_{\text{vz},3} \sin(\theta_2) \sin(\theta_3) + 2.0 I_{\text{xv},3} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},4} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},4} \cos(\theta_2) \cos(\theta_4)^2 - 2.0 I_{\text{xv},5} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},6} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},7} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},8} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},9} \cos(\theta_3)^
        2.0 I_{xy,5} \cos(\theta_2) \cos(\theta_4)^2 - 2.0 I_{xy,5} \cos(\theta_2) \cos(\theta_5)^2 + I_{xx,3} \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - I_{xx,4} \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - I_{xx,5} \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - I_{xx,5} \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - I_{xx,5} \cos(\theta_3) \cos(\theta_3
        I_{\text{XX},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{3}\right)-I_{\text{XX},4}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)-I_{\text{XX},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)+I_{\text{XZ},4}\cos\left(\theta_{3}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{2}\right)-I_{\text{XX},5}\cos\left(\theta_{3}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{3}\right)
        I_{\text{xx},5} \cos (\theta_2) \cos (\theta_5) \sin (\theta_5) - I_{\text{yy},3} \cos (\theta_2) \cos (\theta_3) \sin (\theta_3) + I_{\text{yy},4} \cos (\theta_2) \cos (\theta_3) \sin (\theta_3) + I_{\text{yy},5} \cos (\theta_2) \cos (\theta_3) \sin (\theta_3) + I_{\text{yy},5} \cos (\theta_3) \cos (\theta_3) \sin (\theta_3) + I_{\text{yy},5} \cos (\theta_3) \cos 
    I_{yy,4}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)+I_{yy,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)+I_{yy,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)-I_{yz,4}\cos\left(\theta_{3}\right)\sin\left(\theta_{4}\right)-I_{yz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)
    I_{\text{vz.4}}\cos(\theta_4)\sin(\theta_2)\sin(\theta_3) - I_{\text{xz.4}}\sin(\theta_2)\sin(\theta_3)\sin(\theta_4) + 0.5\,a_2\,\mathrm{lc_{2,2}}\,m_2\cos(\theta_2) + 0.5\,a_3\,\mathrm{lc_{3,2}}\,m_3\cos(\theta_2) - 0.5\,a_3\,\mathrm{lc_{3,2}}\,m_3\cos(\theta_2)
    0.5\,a_4\,\mathrm{lc}_{4,2}\,m_4\,\cos{(\theta_2)} - 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\cos{(\theta_2)} + \mathrm{lc}_{2,1}\,\mathrm{lc}_{2,2}\,m_2\,\cos{(\theta_2)} + \mathrm{lc}_{3,1}\,\mathrm{lc}_{3,2}\,m_3\,\cos{(\theta_2)} - \mathrm{lc}_{4,1}\,\mathrm{lc}_{4,2}\,m_4\,\cos{(\theta_2)} - \mathrm{lc}_{4,1}\,\mathrm{lc}_{4,2}\,m_4\,\cos{(\theta_2)} - \mathrm{lc}_{4,1}\,\mathrm{lc}_{4,2}\,m_4\,\cos{(\theta_2)} + \mathrm{lc}_{4,2}\,m_4\,\cos{(\theta_2)} + \mathrm{l
    lc_{5,1} lc_{5,2} m_5 cos(\theta_2) + lc_{2,2} lc_{2,3} m_2 sin(\theta_2) + 4.0 I_{xv,4} cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 + 4.0 I_{xv,5} cos(\theta_2) cos(\theta_3)^2 cos(\theta_3)^2 cos(\theta_4)^2 + 4.0 I_{xv,5} cos(\theta_2) cos(\theta_3)^2 cos(\theta_3)
    4.0 I_{xy.5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 I_{xy.5} \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{yz.5} \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - I_{yz.5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
    0.25 \, a_3^{-2} \, m_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - a_3^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - a_3^{-2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^{-2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(
    a_4^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_4^2 m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_4^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4^2 m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_4^2 m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_4^2 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_
    0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) - 8.0 I_{xy,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) - 8.0 I_{xy,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.25 a_5^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 \cos(\theta_5) \cos(\theta
    I_{xz,5}\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5)-I_{xz,5}\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)-I_{xz,5}\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)-I_{xz,5}\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)\sin(\theta_5)
 lc_{5,1}{}^2 m_5 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_4)} - lc_{5,2}{}^2 m_5 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_4)} + lc_{5,1}{}^2 m_5 \cos{(\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} - lc_{5,2}{}^2 m_5 \cos{(\theta_5)} \sin{(\theta_5)} + lc_{5,1}{}^2 m_5 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + lc_{5,1}{}^2 m_5 \cos{(\theta_5)} \cos{
    I_{\text{vz.5}}\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{\text{vz.5}}\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{\text{vz.5}}\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-I_{\text{vz.5}}\cos(\theta_5)\sin(\theta_5)\sin(\theta_5)
    0.5 a_2 a_3 m_3 \cos(\theta_2) \cos(\theta_3) - a_2 a_3 m_4 \cos(\theta_2) \cos(\theta_3) - a_2 a_3 m_5 \cos(\theta_2) \cos(\theta_3) - 0.5 a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_5) +
    I_{xz,5} \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \ln a_3 \cos(\theta_2) \cos(\theta_3) + a_3 \ln a_4 \cos(\theta_2) \cos(\theta_4) - a_4 \ln a_5 \cos(\theta_2) \cos(\theta_5) + a_5 \ln a_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_5 \ln a_5 \cos(\theta_2) \cos(\theta_3) + a_5 \ln a_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 \ln a_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 \ln a_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 \ln a_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 \ln a_5 \cos(\theta_3) \cos(\theta
    0.5 \, a_3 \, a_4 \, m_4 \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \cos(\theta_2) \, \sin(\theta_4) + a_2 \, \log_3 2 \, m_3 \, \cos(\theta_2) \, \sin(\theta_3) - 0.5 \, a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_2) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \sin(\theta_3) + a_3 \, \log_3 3 \, m_3 \, \cos(\theta_3) \, \cos(\theta_3)
        a_3 \log_{4.1} m_4 \cos(\theta_2) \sin(\theta_4) - a_3 \log_{4.3} m_4 \cos(\theta_3) \sin(\theta_2) - a_3 \log_{5.3} m_5 \cos(\theta_3) \sin(\theta_2) + a_4 \log_{5.2} m_5 \cos(\theta_2) \sin(\theta_5) - a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) - a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_5) \cos(\theta
    lc_{3,1}lc_{3,3}m_3\cos(\theta_3)\sin(\theta_2)+lc_{3,2}lc_{3,3}m_3\sin(\theta_2)\sin(\theta_3)+2.0I_{xx,4}\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)+2.0I_{xx,4}\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)+2.0I_{xx,4}\cos(\theta_4)\sin(\theta_4)+2.0I_{xx,4}\cos(\theta_4)\sin(\theta_4)
    2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx,5} \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,5} \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta
        2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(
    2.0 I_{yy,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy,4} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{yy,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy,4} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{yy,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy,4} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{yy,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy,4} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{yy,5} \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy,5} \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) - 2.0 I_{yy,5} \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_5) - 2.0 I_{yy,5} \cos(\theta_5) \cos(\theta_
    2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5
        a_4 \ln_{4.2} m_4 \cos(\theta_2) \cos(\theta_3)^2 + a_4 \ln_{4.2} m_4 \cos(\theta_2) \cos(\theta_4)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_2) \cos(\theta_4)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_3)^2 + a_5 \ln_{5
    a_5 \ln \log m_5 \cos (\theta_2) \cos (\theta_5)^2 - 2.0 \ln \log m_3 \cos (\theta_2) \cos (\theta_3)^2 + 2.0 \ln \log m_4 \cos (\theta_2) \cos (\theta_3)^2 + 2.0 \ln \log m_5 \cos (\theta_2) \cos (\theta_3)^2 + 2.0 \ln \log m_5 \cos (\theta_2) \cos (\theta_3)^2 + 2.0 \ln \log m_5 
        2.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 + 2.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_2) \cos(\theta_4)^2 + 2.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_2) \cos(\theta_5)^2 - 0.5 a_2 a_4 m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_5) 
    a_2 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 a_3 a_5 m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_2 \log_{10} m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) - a_2 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) - a_3 \log_{10} m_5 \cos(\theta_5) 
        a_3 \log_{10} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_3 \log_{10} m_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_2 \log_{10} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_3 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{10} m_5 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
        a_2 \ln_{4.2} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + a_4 \ln_{4.1} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4 \ln_{4.1} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \ln_{4.1} m_4 \cos(\theta_4) \cos(\theta_5) \cos
    0.5 a_4 lc_{4,3} m_4 cos(\theta_3) cos(\theta_4) sin(\theta_2) + a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3) sin(\theta_3) - a_3 lc_{5,2} m_5 cos(\theta_2) cos(\theta_4) sin(\theta_5) - a_5 lc_{5,2} m_5 cos(\theta_4) sin(\theta_5) - a_5 lc_{5,2} lc_{5,3} lc_{5,4} lc_{5,4
        a_3 \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_4 \log_{5.3} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + a_5 \log_{5.1} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{5.2} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
        a_5 \log_{10} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 a_4 m_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 a_4 m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
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0.5 a_3 a_5 m_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - \ln_{4,1} \ln_{4,3} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + a_2 \ln_{4,1} m_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - \ln_{4,1} \ln_{4,2} m_4 \cos(\theta_3) \sin(\theta_4) - \ln_{4,1} \ln_{4,2} m_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - \ln_{4,1} \ln_{4,2} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - \ln_{4,1} \ln_{4,2} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - \ln_{4,1} \ln_{4,2} m_4 \cos(\theta_5) \cos(\theta_4) \sin(\theta_5) - \ln_{4,1} \ln_{4,2} m_4 \cos(\theta_5) \cos(\theta_5) \cos(\theta_6) \sin(\theta_5) - \ln_{4,1} \ln_{4,2} m_4 \cos(\theta_5) \cos(\theta_6) \cos(\theta_
a_3 \log_{10} m_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + \log_{10} \log_{10} m_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + \log_{10} \log_{10} m_5 \cos(\theta_4) \sin(\theta_5) + \log_{10} \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
0.5 a_4 lc_{4,3} m_4 sin(\theta_2) sin(\theta_3) sin(\theta_4) + a_4 lc_{5,3} m_5 sin(\theta_2) sin(\theta_3) sin(\theta_4) - 0.5 a_4^2 m_4 cos(\theta_2) cos(\theta_3) cos(\theta_4)^2 sin(\theta_3) - 0.5 a_4 lc_{4,3} m_4 sin(\theta_2) sin(\theta_3) sin(\theta_4) + a_4 lc_{5,3} m_5 sin(\theta_2) sin(\theta_3) sin(\theta_4) - 0.5 a_4^2 m_4 cos(\theta_2) cos(\theta_3) cos(\theta_4)^2 sin(\theta_3) - 0.5 a_4^2 lc_{4,3} m_4 sin(\theta_2) sin(\theta_3) sin(\theta_4) + a_4 lc_{5,3} m_5 sin(\theta_2) sin(\theta_3) sin(\theta_4) - 0.5 a_4^2 lc_{4,3} m_4 cos(\theta_2) cos(\theta_3) cos(\theta_4)^2 sin(\theta_3) sin(\theta_4) - 0.5 a_4^2 lc_{4,3} m_4 cos(\theta_2) cos(\theta_3) cos(\theta_4)^2 sin(\theta_3) sin(\theta_4) - 0.5 a_4^2 lc_{4,3} m_4 cos(\theta_2) cos(\theta_3) cos(\theta_4)^2 sin(\theta_3) cos(\theta_4)^2 sin(\theta_3) cos(\theta_4)^2 sin(\theta_4) - 0.5 a_4^2 lc_{4,3} m_4 cos(\theta_4) cos(\theta_4)^2 sin(\theta_3) cos(\theta_4)^2 sin(\theta_4) - 0.5 a_4^2 lc_{4,3} m_4 cos(\theta_4)^2 sin(\theta_4)^2 sin(
0.5 a_4^2 m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4)
0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_5^2 m_5 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_5^2 m_5 \cos(\theta_4) \cos(\theta_5) \cos
0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \cos(\theta_5) 
lc_{4,1}lc_{4,3}m_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-2.0lc_{4,1}^2m_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)-2.0lc_{4,1}^2m_4\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)\sin(\theta_4)+1.0lc_{4,1}lc_{4,3}m_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-2.0lc_{4,1}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{
2.0 \log_{4.2}^{2} m_4 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 2.0 \log_{4.2}^{2} m_4 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{5.1}^{2} m_5 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} - 2.0 \log_{5.1}^{2} m_5 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 2.0 \log_{5.1}^{2} m_5 \cos{(\theta_4)} \cos{(\theta_5)} \cos{
2.0 \log_{5.1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} - 2.0 \log_{5.1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \cos{(\theta_{3})} 
2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{5})^{2}} \sin{(\theta_{3})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{5})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{5})} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{
2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{4})} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{5})} \cos
2.0 \log_{5,2}{}^2 m_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{}^2 m_5 \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + a_4 a_5 m_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)} + a_5 \cos{(\theta_5)} \sin{(\theta_5)} + a_5 \cos{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} + a_5 \cos{(\theta_5)} \cos{
a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) - 2.0 a_3 \log_{4.2} m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) + 2.0 a_4 \log_{5.1} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) + 2.0 \log_{10} (\theta_5) \cos(\theta_5) \cos(\theta
2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} - a_3 \, a_4 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_3 \, a_4 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_4 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_5)} \, 
2.0 a_3 lc_{4,1} m_4 cos(\theta_2) cos(\theta_3)^2 sin(\theta_4) - 2.0 a_4 lc_{5,2} m_5 cos(\theta_2) cos(\theta_3)^2 sin(\theta_5) - 2.0 a_4 lc_{5,2} m_5 cos(\theta_2) cos(\theta_4)^2 sin(\theta_5) - 2.0 a_4 lc_{5,2} m_5 cos(\theta_5)^2 sin(\theta_5) - 2.0 a_4 lc_{5,2} m_5 cos(\theta_5)^2 sin(\theta_5)^2 sin(\theta_5) - 2.0 a_4 lc_{5,2} m_5 cos(\theta_5)^2 sin(\theta_5)^2 sin(
4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)
4.0 I_{vv,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{vv,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{vv,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{vv,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{vv,5} \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{vv,5} \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2
    2.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \cos{(\theta_5)}^2 \cos{(\theta_
2.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 lc_{4,1} lc_{4,2} m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \cos(\theta_3)^2 \cos(\theta_3
    4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 - 4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xy,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5)^2 + 4.0 \log_{5.2} \log_{5.2} m_5 \cos(\theta_5)^2 + 4.0 \log_
    4.0\,I_{\text{xy},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{3}\right)\,\cos\left(\theta_{4}\right)\,\sin\left(\theta_{3}\right)\,\sin\left(\theta_{4}\right) - 4.0\,I_{\text{xy},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{3}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xy},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{4}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xy},5}\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xy},5}\,\cos\left(\theta_{5}\right) - 4.0\,I_{\text{xy},5}
    2.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{4.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{
a_2 \ln 1 = a_2 \ln 1 = a_3 \ln 1 = a_4 \ln 1 = a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 \ln 1 = a_5 \ln 1 = a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 \ln 1 = a_5 \ln 1 = a
    a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + lc_{5,2} lc_{5,3} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + lc_{5,3} lc_{5,4} lc_{5,4} lc_{5,5} lc_{5,5} lc_{5,6} lc
4.0 a_5 \log_2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 a_3 \log_4 m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_2 \log_5 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_5 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(
a_2 \ln_{5,2} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_2 \ln_{5,2} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 2.0 a_4 \ln_{5,1} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - a_5 \ln_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) - a_5 \ln_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \ln_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \ln_{5,2} m_5 \cos(\theta_5) \cos(\theta
2.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta
0.5 a_5 \log_{3} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_5 m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 8.0 \log_{10} \log_{10} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 8.0 \log_{10} \log_{10} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
lc_{5,1} lc_{5,3} m_5 cos(\theta_3) cos(\theta_4) sin(\theta_2) sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 cos(\theta_3) cos(\theta_5) sin(\theta_2) sin(\theta_4) + lc_{5,1} lc_{5,3} m_5 cos(\theta_4) cos(\theta_5) sin(\theta_2) sin(\theta_3) - lc_{5,1} lc_{5,3} l
a_2 \ln c_{5,1} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - \ln c_{5,2} \ln c_{5,3} m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - \ln c_{5,2} \ln c_{5,3} m_5 \cos(\theta_4) \sin(\theta_5) - \ln c_{5,2} \ln c_{5,3} m_5 \cos(\theta_5) - \ln c_{5,2} \ln c_{5,2} m_5 \cos(\theta_5) - \ln c_{5,2
lc_{5,2}lc_{5,3}m_5\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4) + 8.0I_{xy,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_3)\sin(\theta_4) + 8.0I_{xy,5}\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)\sin(\theta_4) + 8.0I_{xy,5}\cos(\theta_5)\sin(\theta_5)
8.0 I_{xy.5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{3} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - \log_{10} \log_{10} (\theta_5) \sin(\theta_5) \sin(\theta_5)
a_3 a_5 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) - 2.0 a_3 \ln \log m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) - 2.0 a_4 \ln m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2.0 a_4 \ln m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2.0 a_5 \ln m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2.0 a_5 \ln m_5 \cos(\theta_2) \cos(\theta_3) 
2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 2.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}
2.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \,
2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \mathrm{lc}_{5 \, 1
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a_3 a_5 m_5 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_4) \sin(\theta_5) + 2.0 a_3 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + a_5 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_4) \sin(\theta_5) + a_5 \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) + a_5 \cos(\theta_5) \cos(\theta_5)
a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{10}^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{10}^2 m_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 4.0 \log_{10}^2 m_5 \cos(\theta_5) \cos(\theta
    4.0 \log_{5,1}{^2} m_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 4.0 \log_{5,2}{^2} m_5 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} +
    4.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 4.0 \log_{10} 2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
    4.0 \log_{5} 2^{2} m_{5} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 2.0 a_{4} a_{5} m_{5} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) - 4.0 a_{4} \log_{5} 1 m_{5} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) + 4.0 \log_{5} 1 m_{5} \cos(\theta_{5}) \cos(
    4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - a_3 \, a_4 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - a_4 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} + a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{lc}_{
2.0 \, a_3 \, a_4 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_2 \, a_5 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_2 \, a_5 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_2 \, a_5 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_2 \, a_5 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_2 \, a_5 \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_3 \, a_4 \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, a_5 \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, a_5 \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, a_5 \, m_5 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, a_5 \, m_5 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \cos(\theta_5) 
0.5 a_2 a_5 m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 2.0 a_3 \log_{10} \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 a_4 \log_{10} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 4.0 \log_{10} \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{10} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{10} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 2.0 \, a_4 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 2.0 \, a_4 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, a_5 \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \cos{(\theta_5)} \, \cos
    2.0 \, a_4 \, a_5 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \cos(\theta_3)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, 
    4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \mathrm{lc}_{5.1} 
    4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3)^2 cos(\theta_4) cos(\theta_5)^2 sin(\theta_4) + 4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 cos(\theta_5) sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 cos(\theta_5) sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 cos(\theta_5) sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 cos(\theta_5) sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 cos(\theta_5) sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 cos(\theta_5) sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 cos(\theta_5)^2 c
    4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{yy,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{yy,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 I_{yy,5} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
2.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \cos\left(\theta_2\right) \, \cos\left(\theta_3\right) \, \cos\left(\theta_4\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_3\right) + a_3 \, a_5 \, m_5 \, \cos\left(\theta_2\right) \, \cos\left(\theta_4\right) \, \sin\left(\theta_3\right) \, \sin\left(\theta_5\right) + a_3 \, a_5 \, m_5 \, \cos\left(\theta_2\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_3\right) \, \sin\left(\theta_4\right) + a_3 \, a_5 \, m_5 \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_3 \, a_5 \, m_5 \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_3 \, a_5 \, m_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_3 \, a_5 \, m_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_3 \, a_5 \, m_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_5 \, a_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_5 \, a_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_5 \, a_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5\right) \, \sin\left(\theta_5\right) + a_5 \, a_5 \, \cos\left(\theta_5\right) \, \cos\left(\theta_5
2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5)
2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_
    2.0 a_5 \log_2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 a_5 \log_2 m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 a_5 \log_2 m_5 \cos(\theta_5) \cos(\theta_5) \cos
    4.0 \log_{4.1} \log_{4.2} m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \cos(
    4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
    4.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
    4.0 a_5 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 8.0 \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
8.0 \, \text{lc}_{5,1} \, \text{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 8.0 \, \text{lc}_{5,1} \, \text{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5^2 \, m_5^2 \, m_5^2 \, m_5^2 \, \cos{(\theta_5)} \, \cos{(\theta
    4.0 \log_{5.2}^{2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.2}^{2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.2}^{2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.2}^{2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5.2}^{2} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5.2}^{2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
    4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \mathrm{lc}_{5.2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (A3)
         4.0 a_5 lc_{5,1} m_5 cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5) sin(\theta_3) sin(\theta_4) sin(\theta_5)
```

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M_{13} = I_{yz,4} \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - I_{zz,4} \sin(\theta_2) - I_{zz,5} \sin(\theta_2) - I_{yz,3} \cos(\theta_2) \cos(\theta_3) - I_{xz,3} \cos(\theta_2) \sin(\theta_3) - 0.25 a_3^2 m_3 \sin(\theta_2) - 0.25 a_3^2 m_3 \cos(\theta_2) \cos(\theta_
a_3^2 m_4 \sin(\theta_2) - a_3^2 m_5 \sin(\theta_2) - 0.25 a_4^2 m_4 \sin(\theta_2) - a_4^2 m_5 \sin(\theta_2) - 0.25 a_5^2 m_5 \sin(\theta_2) - \log_{3,1}^2 m_3 \sin(\theta_2) - \log_{3,2}^2 m_3 \sin(\theta_2) - \log_{3,2}^2 m_5 \cos(\theta_2) - \log_{3,2}
lc_{4,1}^2 m_4 \sin(\theta_2) - lc_{4,2}^2 m_4 \sin(\theta_2) - lc_{5,1}^2 m_5 \sin(\theta_2) - lc_{5,2}^2 m_5 \sin(\theta_2) - I_{yz,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - I_{xz,4} \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - I_{xz,4} \cos(\theta_4) \cos(\theta_5) \cos(\theta_
I_{xz,4}\cos(\theta_2)\cos(\theta_4)\sin(\theta_3) - I_{zz,3}\sin(\theta_2) + a_1\log_{3,2}m_3\cos(\theta_3) + 0.5a_1a_3m_3\sin(\theta_3) + a_1a_3m_4\sin(\theta_3) + a_1a_3m_5\sin(\theta_3) + a_1a_3m_5\cos(\theta_3) + a_1a_3m_5\cos(
a_1 \log_{3.1} m_3 \sin(\theta_3) - a_3 \log_{3.1} m_3 \sin(\theta_2) - a_4 \log_{4.1} m_4 \sin(\theta_2) - a_5 \log_{5.1} m_5 \sin(\theta_2) - I_{xz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_5 \log_{5.1} m_5 \sin(\theta_2) - a_5 \log_{5.1} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_
0.5 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \sin{(\theta_3)} \, \sin{(\theta_2)} + a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \sin{(\theta_5)} \, \sin{(\theta_2)} + I_{yz,5} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + I_{yz,5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + I_{yz,5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + I_{yz,5} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + I_{yz,5} \, \cos{(\theta_5)} \, \cos{
I_{\mathbf{vz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{4}\right)+I_{\mathbf{vz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{3}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{4}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{x
I_{xz,5}\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) - I_{yz,5}\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.25 a_2 a_3 m_3\cos(\theta_2)\cos(\theta_3) + 0.5 a_2 a_3 m_4\cos(\theta_2)\cos(\theta_3) + 0.5 a_2 a_3 m_5\cos(\theta_2)\cos(\theta_3) + 0.5 a_2 a_3 m_5\cos(\theta_3)\cos(\theta_3) + 0.5 a_2 a_3 m_5\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(
    0.5 \, a_2 \, a_3 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) + 0.5 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \cos(\theta_2) \, \cos(\theta_3) + a_1 \, \mathrm{lc}_{4.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_4) - a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \cos(\theta_2) \, \cos(\theta_4) - a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_2) \, \cos(\theta_5) + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_4) - a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5.2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5.2} \, m_4 \, \cos(\theta_3) \, \cos(
    0.5 a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + 0.5 a_1 a_4 m_4 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) - 0.5 a_3 a_4 m_4 \cos(\theta_2) \sin(\theta_4) - 0.5 a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + a_1 a_4 a_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 a_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 a_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 a_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 a_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 a_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 a_5 \cos(\theta_4) 
    0.5 \, a_3 \, a_4 \, m_4 \, \cos(\theta_4) \, \sin(\theta_2) - a_3 \, a_4 \, m_5 \, \cos(\theta_2) \, \sin(\theta_4) - a_3 \, a_4 \, m_5 \, \cos(\theta_4) \, \sin(\theta_2) + \log_3 2 \log_{3.3} m_3 \, \cos(\theta_2) \, \cos(\theta_3) - 0.5 \, a_2 \log_{3.2} m_3 \, \cos(\theta_2) \, \sin(\theta_3) - \log(\theta_3) \, \sin(\theta_3) + \log(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3
    0.5 a_2 \log_{12} m_3 \cos(\theta_3) \sin(\theta_2) + 0.25 a_3 \log_{13} m_3 \cos(\theta_2) \sin(\theta_3) + 0.25 a_3 \log_{13} m_3 \cos(\theta_3) \sin(\theta_2) + a_1 \log_{14} m_4 \cos(\theta_3) \sin(\theta_4) + a_2 \log_{14} m_4 \cos(\theta_3) \sin(\theta_4) + a_3 \log_{14} m_4 \cos(\theta_3) \sin(\theta_4) + a_4 \log_{14} m_4 \cos(\theta_3) \sin(\theta_4) + a_4 \log_{14} m_4 \cos(\theta_3) \sin(\theta_4) + a_4 \log_{14} m_4 \cos(\theta_4) \cos(\theta_4)
    a_1 \log_{10} m_4 \cos(\theta_4) \sin(\theta_3) - a_3 \log_{11} m_4 \cos(\theta_2) \sin(\theta_4) - a_3 \log_{11} m_4 \cos(\theta_4) \sin(\theta_2) + a_3 \log_{11} m_4 \cos(\theta_2) \sin(\theta_3) + a_3 \log_{11} m_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_3 \log_{11} m_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_3 \log_{11} m_4 \cos(\theta_3) \cos(
    a_4 \log_{10} a_5 \cos(\theta_2) \sin(\theta_5) + a_4 \log_{10} a_5 \cos(\theta_5) \sin(\theta_2) - 0.25 a_2 a_3 a_3 \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_3 a_4 \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_3 a_5 \sin(\theta_2) \sin(\theta_3) + a_4 \log_{10} a_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{10} a_5 \cos(\theta_5) \sin(\theta_5) - 0.25 a_2 a_3 a_3 \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_3 a_5 \sin(\theta_3) - 0.5 a_2 a_3 a_5 \sin(\theta_3) + a_4 \log_{10} a_5 \cos(\theta_5) \sin(\theta_5) - 0.25 a_2 a_3 a_5 \sin(\theta_5) \sin(\theta_5) - 0.25 a_2 a_3 a_5 \cos(\theta_5) \sin(\theta_5) - 0.25 a_3 a_5 \cos(\theta_5) \sin(\theta_5) - 0.25 a_4 a_5 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 a_5 \cos(\theta_5) 
    a_4 a_5 m_5 \sin(\theta_2) \sin(\theta_5) + \ln_{3,1} \ln_{3,3} m_3 \cos(\theta_2) \sin(\theta_3) - 0.5 a_2 \ln_{3,1} m_3 \sin(\theta_2) \sin(\theta_3) - a_1 \ln_{4,2} m_4 \sin(\theta_3) \sin(\theta_4) + a_3 \ln_{4,2} m_4 \sin(\theta_2) \sin(\theta_4) + a_4 \ln_{4,2} m_4 \sin(\theta_3) \sin(\theta_4) + a_5 \ln_{4,2} m_4 \sin(\theta_3) \cos(\theta_4) + a_5 \ln_{4,2} m_4 \sin(\theta_4) + a_5 \ln_{4,2} m_4 \cos(\theta_4) + a_5 \ln_{4,2} m_4 \cos(\theta_4) + a_5 \ln_{4,2} m_5 \cos(\theta_4) + a_
    a_4 \log_{10} m_5 \sin(\theta_2) \sin(\theta_5) - 0.25 a_2 a_3 m_3 \cos(\theta_3) \cos(\theta_2) - 0.5 a_2 a_3 m_4 \cos(\theta_3) \cos(\theta_2) - 0.5 a_2 a_3 m_5 \cos(\theta_3) \cos(\theta_2) - 0.5 a_2 \log_{10} m_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_2) - 0.5 a_2 \log_{10} m_5 \cos(\theta_3) 
    a_3 \log_{4.2} m_4 \cos(\theta_4) \cos(\theta_2) + a_4 \log_{5.1} m_5 \cos(\theta_5) \cos(\theta_2) - 0.5 a_3 a_4 m_4 \cos(\theta_4) \sin(\theta_2) + 0.5 a_3 a_4 m_4 \sin(\theta_4) \cos(\theta_2) - a_3 a_4 m_5 \cos(\theta_4) \sin(\theta_2) + 0.5 a_5 a_5 \cos(\theta_4) \sin(\theta_4) \cos(\theta_5) 
    a_3 a_4 m_5 \sin(\theta_4) \cos(\theta_2) - 0.5 a_2 \log_2 m_3 \cos(\theta_3) \sin(\theta_2) + 0.5 a_2 \log_2 m_3 \sin(\theta_3) \cos(\theta_2) - 0.25 a_3 \log_3 m_3 \cos(\theta_3) \sin(\theta_2) + 0.5 a_2 \log_3 m_3 \cos(\theta_3) \sin(\theta_2) + 0.5 a_2 \log_3 m_3 \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(
    0.25 \, a_3 \, \mathrm{lc}_{3,3} \, m_3 \, \sin{(\theta_3)} \, \cos{(\theta_2)} - a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \sin{(\theta_4)} \, \cos{(\theta_2)} + a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} 
    0.25 \, a_2 \, a_3 \, m_3 \, \sin(\theta_3) \, \sin(\theta_2) - 0.5 \, a_2 \, a_3 \, m_4 \, \sin(\theta_3) \, \sin(\theta_2) - 0.5 \, a_2 \, a_3 \, m_5 \, \sin(\theta_3) \, \sin(\theta_2) + 0.5 \, a_1 \, a_5 \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_1 \, a_2 \, m_3 \, \sin(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3)
    a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + \log_{10} \log_{10} m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - \log_{10} \log_{10} (\theta_4) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 0.5 a_4 \log_{10} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + \log_{10} m_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) + \log_{10} m_4 \cos(\theta_5) \cos
    0.5 a_4 lc_4 a_3 m_4 cos(\theta_2) cos(\theta_4) sin(\theta_3) - a_1 lc_5 a_2 m_5 cos(\theta_3) cos(\theta_4) sin(\theta_5) - a_1 lc_5 a_2 m_5 cos(\theta_3) cos(\theta_5) sin(\theta_4) - a_1 lc_5 a_2 m_5 cos(\theta_4) cos(\theta_5) sin(\theta_3) + a_1 lc_5 a_2 m_5 cos(\theta_5) sin(\theta_5) - a_1 lc_5 a_5 lc_5 cos(\theta_5) sin(\theta_5) - a_1 lc_5 cos(\theta_5) sin(
    2.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_2 \, a_4 \, m_4 \, \cos{(\theta_3)} \, \sin{(\theta_2)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_2 \, a_4 \, m_4 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta
    0.5 a_2 a_4 m_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - a_2 a_4 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - a_2 a_4 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 0.5 a_1 a_5 m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 a_4 m_5 \cos(\theta_4) \sin(\theta_5) - a_3 a_4 m_5 \cos(\theta_5) \sin(\theta_5) - a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_5) - a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_5) - a_5 a_5 m_5 \cos(\theta_5) \cos
    0.5 a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_3 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_5 a_5 a_5 \cos(\theta_4) \sin(\theta_5) + a_5 a_5 a_5 \cos(\theta_5) \sin(\theta_5) + a_5 a_5 \cos(\theta_5) 
    lc_{4} lc_{4} lc_{4} m_{4} cos(\theta_{2}) cos(\theta_{3}) sin(\theta_{4}) + lc_{4} lc_{4} m_{4} cos(\theta_{2}) cos(\theta_{4}) sin(\theta_{3}) - a_{2} lc_{4} m_{4} cos(\theta_{3}) sin(\theta_{2}) sin(\theta_{4}) - a_{2} lc_{4} m_{4} cos(\theta_{4}) sin(\theta_{2}) sin(\theta_{3}) - a_{4} lc_{4} m_{4} cos(\theta_{3}) sin(\theta_{4}) - a_{4} lc_{4} m_{4} cos(\theta_{4}) sin(\theta_{3}) - a_{4} lc_{4} m_{4} cos(\theta_{3}) sin(\theta_{4}) - a_{4} lc_{4} m_{4} cos(\theta_{3}) sin(\theta_{4}) - a_{4} lc_{4} m_{4} cos(\theta_{3}) sin(\theta_{4}) - a_{4} lc_{4} m_{4} cos(\theta_{3}) sin(\theta_{3}) s
    a_1 \log_{10} m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_1 \log_{11} m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 a_3 \log_{11} m_5 \cos(\theta_4) \sin(\theta_5) + a_1 \log_{11} m_5 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \cos(\theta_5) \cos
    2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + a_1 \, \mathrm{lc}_{5.2} \, m_5 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + a_1 \, \mathrm{lc}_{5.2} \, m_5 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + a_2 \, \mathrm{lc}_{5.2} \, m_5 \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \sin{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \mathrm{lc}_{5.2} \, m_
    2.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \cos{(\theta_5)} 
    lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta
    a_2 \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_2 \log_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - a_2 \log_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_2 \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta
    0.5 a_5 \log_{10} a_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \log_{10} a_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(\theta_5) \cos(
    0.5 a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_5) \cos(\theta
    lc_{5,1} lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \cos(\theta_5) \cos(\theta
    a_2 \log_{10} m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{11} m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + a_2 \log_{11} m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{11} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
    lc_{5,2} lc_{5,3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 lc_{5,2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_5) \cos(\theta_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (A4)
    0.5 a_2 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2)
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M_{14} = I_{yz,4} \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - I_{zz,5} \sin(\theta_2) - 0.25 a_4^2 m_4 \sin(\theta_2) - a_4^2 m_5 \sin(\theta_2) - 0.25 a_5^2 m_5 \sin(\theta_2) - lc_{4,1}^2 m_4 \sin(\theta_2) - lc_{4,1}^2 m_5 m_5 \cos(\theta_2) - lc
lc_{4,2}^2 m_4 \sin(\theta_2) - lc_{5,1}^2 m_5 \sin(\theta_2) - lc_{5,2}^2 m_5 \sin(\theta_2) - I_{yz,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - I_{xz,4} \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - I_{xz,4} \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - I_{yz,4} \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - I_{xz,4} \cos(\theta_4) \cos(\theta_5) \cos(\theta
I_{zz,4} \sin(\theta_2) - a_4 \log_{4.1} m_4 \sin(\theta_2) - a_5 \log_{5.1} m_5 \sin(\theta_2) - I_{xz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{yz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + I_{yz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + I_{yz,5} \cos(\theta_4) \cos(\theta_5) + I_{yz,5} \cos(\theta_5) \cos(\theta_5
I_{\mathbf{vz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{4}\right)+I_{\mathbf{vz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{3}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{4}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{\mathbf{xz},5}\cos\left(\theta_{5}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)
    I_{xz,5} \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - I_{yz,5} \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 l_{c_4,2} m_4 \cos(\theta_3) \cos(\theta_4) + 0.5 a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + 0.5 a_2 \sin(\theta_4) \sin(\theta_5) \sin(
    0.5 a_1 a_4 m_4 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) - 0.5 a_3 a_4 m_4 \cos(\theta_4) \sin(\theta_2) - a_3 a_4 m_5 \cos(\theta_4) \sin(\theta_2) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \cos
    a_1 \log_{1.1} m_4 \cos(\theta_3) \sin(\theta_4) + a_1 \log_{1.1} m_4 \cos(\theta_4) \sin(\theta_3) - a_3 \log_{1.1} m_4 \cos(\theta_4) \sin(\theta_2) + 2.0 a_4 \log_{1.1} m_5 \cos(\theta_5) \sin(\theta_2) + a_4 a_5 m_5 \sin(\theta_2) \sin(\theta_5) - a_5 \log_{1.1} m_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{1.1} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{1.1} m_5 \cos(\theta_5) \cos(\theta
    a_1 \log_4 2m_4 \sin(\theta_3) \sin(\theta_4) + a_3 \log_4 2m_4 \sin(\theta_2) \sin(\theta_4) + 2.0 a_4 \log_4 m_5 \sin(\theta_2) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_5) +
    a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + \log_{10} \log_{10} m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - \log_{10} \log_{10} (\theta_4) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 0.5 a_4 \log_{10} m_4 \cos(\theta_3) \sin(\theta_4) + \log_{10} m_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) + \log_{10} m_4 \cos(\theta_5) \cos
    0.5 a_4 \log_{10} a_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - a_1 \log_{10} a_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{10} a_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{10} a_5 \cos(\theta_5) \sin(\theta_5) - a_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \cos(\theta_5) \cos(\theta_5)
    a_3 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_4 \log_{5.3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{5.3} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
    0.5 a_2 a_4 m_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - a_2 a_4 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - a_2 a_4 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 0.5 a_1 a_5 m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 a_4 m_5 \cos(\theta_4) \sin(\theta_5) - a_3 a_4 m_5 \cos(\theta_5) \sin(\theta_5) - a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_5) - a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_5) - a_5 a_5 m_5 \cos(\theta_5) \cos
    0.5 a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_3 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \cos(\theta_5) \cos(
    lc_{4,1}lc_{4,3}m_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)+lc_{4,1}lc_{4,3}m_4\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)-a_2lc_{4,1}m_4\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)-a_2lc_{4,1}m_4\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\sin(\theta_4)-a_2lc_{4,1}m_4\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)
    a_1 \log_{10} m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_1 \log_{11} m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_3 \log_{11} m_5 \cos(\theta_4) \sin(\theta_5) + a_4 \log_{11} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin
    a_3 \log_{10} m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - \log_{10} \log_{10} m_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{10} m_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_1 \log_{10} m_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
    a_3 \log_{5,2} m_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + \log_{5,1} \log_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_2 \log_{5,1} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_3 \log_{5,2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta
    lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,2}lc_{5,3}m_5\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_3)\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)
    a_2 \ln_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \ln_{5,2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_2 \ln_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - a_2 \ln_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_3 \ln_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta
    0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 \log_3 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_5) \cos(\theta_
    0.5 a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_5) \cos(\theta
    lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,2}lc_{5,2}m_5\cos(\theta_5)-lc_{5,
    a_2 \ln 1 + a_2 \ln 1 + a_3 \ln 1 + a_4 \ln 1 + a_5 
    lc_{5,2}lc_{5,3}m_{5}\cos(\theta_{2})\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5})-a_{2}lc_{5,2}m_{5}\sin(\theta_{2})\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5})+0.5a_{5}lc_{5,3}m_{5}\cos(\theta_{2})\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})-a_{5}lc_{5,3}m_{5}\cos(\theta_{5})
    0.5 a_2 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (A5)
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 $M_{15} = I_{\text{vz.5}} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_5^2 m_5 \sin(\theta_2) - \ln \ln \theta_5 - \ln \theta_5 \sin(\theta_2) - \ln \ln \theta_5 - \ln \theta_5 \sin(\theta_2) I_{xz,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) - I_{zz,5}\sin(\theta_2) + I_{yz,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4) + I_{yz,5}\cos(\theta_2)\cos(\theta_4)\cos(\theta_5) + I_{yz,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + I_{yz,5}\cos(\theta_4)\cos(\theta_5)\cos(\theta_5) + I_{yz,5}\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + I_{yz,5}\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + I_{yz,5}\cos(\theta_5)$ $I_{xz,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{4}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{4}\right)-I_{yz,5}\cos\left(\theta_{2}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)$ $a_4 \log_{5.2} m_5 \cos(\theta_5) \sin(\theta_2) + 0.5 a_4 a_5 m_5 \sin(\theta_2) \sin(\theta_5) + a_4 \log_{5.1} m_5 \sin(\theta_2) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 a_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 a_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_4 a_5 m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \cos(\theta_5) \cos(\theta$ $a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{10} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 \log_{10} m_5 \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5$ $a_3 \log_{2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 0.5 a_1 a_5 m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_2 \cos(\theta_5) \cos($ $0.5 \, a_3 \, a_5 \, m_5 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_2) \, \sin(\theta_4) - a_1 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - a_1 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) - a_1 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_4) \, \sin(\theta_5) - a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_4) \, \sin(\theta_5) - a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_4) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_4) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_4) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{lc}_{5,2} \, \mathrm{lc$ $a_1 \ln \log a_1 + a_2 \ln a_3 + a_3 \ln a_4 + a_3 \ln a_5 + a_5 \ln a_5 + a_$ $a_3 \log_{5,2} m_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + \log_{5,1} \log_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_2 \log_{5,1} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_3 \log_{5,2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta$ $lc_{5,2}lc_{5,3}m_{5}\cos(\theta_{2})\cos(\theta_{3})\cos(\theta_{4})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\cos(\theta_{2})\cos(\theta_{3})\cos(\theta_{5})\sin(\theta_{4})-lc_{5,2}lc_{5,3}m_{5}\cos(\theta_{2})\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{3})+lc_{5,2}lc_{5,3}m_{5}\cos(\theta_{2})\cos(\theta_{3})\cos(\theta_{4})\sin(\theta_{5})$ $a_2 \ln_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \ln_{5,2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_2 \ln_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - a_2 \ln_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_3 \ln_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta$ $0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 \log_3 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_4) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 \log_3 m_5 \cos(\theta_5) \cos(\theta_$ $0.5 a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_5) \cos(\theta$ $lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+$ $a_2 \ln 1 + a_2 \ln 1 + a_3 \ln 1 + a_4 \ln 1 + a_5 \ln 1 + a_5$ $lc_{5,2} lc_{5,3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 lc_{5,2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_5 lc_{5,3} m_5 \cos(\theta_5) - a_5 lc_{5,3} m_5$ $0.5 a_2 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2)$

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M_{21} = I_{xy.4} \cos(\theta_2) - I_{xy.3} \cos(\theta_2) - I_{xy.2} \cos(\theta_2) + I_{xy.5} \cos(\theta_2) - I_{yz.2} \sin(\theta_2) + I_{xz.3} \cos(\theta_3) \sin(\theta_2) - I_{yz.3} \cos(\theta_3) \sin(\theta_3) - I_{xy.4} \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) + I_{xy.5} \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3)
     I_{\text{vz},3} \sin(\theta_2) \sin(\theta_3) + 2.0 I_{\text{xv},3} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},4} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},4} \cos(\theta_2) \cos(\theta_4)^2 - 2.0 I_{\text{xv},4} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{\text{xv},4} \cos
     2.0 I_{xy,5} \cos(\theta_2) \cos(\theta_3)^2 - 2.0 I_{xy,5} \cos(\theta_2) \cos(\theta_4)^2 - 2.0 I_{xy,5} \cos(\theta_2) \cos(\theta_5)^2 + I_{xx,3} \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{xy,5} \cos(\theta_2) \cos(\theta_3)^2 + 2.0 I_{xy,5} \cos(\theta_3) \sin(\theta_3) - 2.0 I_{xy,5} \cos(\theta_3) \cos(\theta_3)^2 + 2.0 I_{xy,5} \cos(
     I_{\text{xx},4}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{3}\right)-I_{\text{xx},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{3}\right)-I_{\text{xx},4}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)-I_{\text{xx},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)+I_{\text{xx},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{3}\right)
     I_{xz,4}\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)-I_{xx,5}\cos(\theta_2)\cos(\theta_5)\sin(\theta_5)-I_{yy,3}\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)+I_{yy,4}\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)+I_{yy,4}\cos(\theta_3)\sin(\theta_3)
     I_{\text{VV},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{3}\right)+I_{\text{VV},4}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)+I_{\text{VV},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{4}\right)+I_{\text{VV},5}\cos\left(\theta_{2}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)-I_{\text{VV},5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)
     I_{\text{vz.4}}\cos(\theta_3)\sin(\theta_2)\sin(\theta_4) - I_{\text{vz.4}}\cos(\theta_4)\sin(\theta_2)\sin(\theta_3) - I_{\text{xz.4}}\sin(\theta_2)\sin(\theta_3)\sin(\theta_4) + 0.5a_2\log_{12}m_2\cos(\theta_2) + 0.5a_2\log_{12}m_2\cos(\theta_2)
     0.5 \, a_3 \, \mathrm{lc}_{3,2} \, m_3 \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + \mathrm{lc}_{2,1} \, \mathrm{lc}_{2,2} \, m_2 \, \cos{(\theta_2)} + \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{
     lc_{4,1} lc_{4,2} m_4 cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 cos(\theta_2) + lc_{2,2} lc_{2,3} m_2 sin(\theta_2) + 4.0 I_{xy,4} cos(\theta_2) cos(\theta_3)^2 cos(\theta_4)^2 + 4.0 I_{xy,5} cos(\theta_2) cos(\theta_3)^2 c
     4.0 I_{xy,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 I_{xy,5} \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{yz,5} \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - I_{yz,5} \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - I_{yz,5} \cos(\theta_5) \cos
     0.25 \, a_3^2 \, m_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - a_3^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - a_3^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_4 \, \cos{(\theta_3)} \, \cos{(
     a_4^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_4^2 m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_4^2 m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5^2 m_5 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_4) \sin(\theta_3) + 0.25 a_5^2 m_5 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(
     a_4^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) - 0.00 \cos(\theta_4) \sin(\theta_4) + 0.00 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
     8.0 I_{xy,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{xz,5} \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - I_{xz,5} \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - I_{xz,5} \cos(\theta_5) \sin(\theta_5) - I_{xz,5} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - I_{xz,5} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
     I_{xz,5} \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - \log_{11}^2 m_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + \log_{12}^2 m_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + \log_{12}^2 m_3 \cos(\theta_3) \cos(\theta
\frac{1c_{4,1}^2 m_4 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} - 1c_{4,2}^2 m_4 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} + 1c_{4,1}^2 m_4 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_4)} - 1c_{4,2}^2 m_4 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_4)} + 1c_{5,1}^2 m_5 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} + 1c_{5,1}^2 m_5 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_4)} - 1c_{5,2}^2 m_5 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_4)} + 1c_{5,1}^2 m_5 \cos{(\theta_4)} \cos{(\theta_4)} \sin{(\theta_4)} + 1c_{5,1}^2 m_5 \cos{(\theta_4)} \cos{(\theta_4)} \sin{(\theta_4)} + 1c_{5,1}^2 m_5 \cos{(\theta_4)} 
     lc_{5,1}^2 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) - lc_{5,2}^2 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) + I_{vz,5} \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + I_{vz,5} \cos(\theta_3) \sin(\theta_5) + I_{vz,5} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
          I_{\text{vz.5}} \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + I_{\text{vz.5}} \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 a_3 m_3 \cos(\theta_2) \cos(\theta_3) - 0.5 a_2 a_3 m_3 \cos(\theta_2) \cos(\theta_3) - 0.5 a_2 a_3 m_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_
          a_2 a_3 m_4 \cos(\theta_2) \cos(\theta_3) - a_2 a_3 m_5 \cos(\theta_2) \cos(\theta_3) - 0.5 a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_5) + I_{xz} \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_3) + I_{xz} \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_3) + 0.5 a_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + 0.5 a_5 \cos(\theta_3) \cos
          a_2 \log_{3.1} m_3 \cos(\theta_2) \cos(\theta_3) + a_3 \log_{4.2} m_4 \cos(\theta_2) \cos(\theta_4) - a_4 \log_{5.1} m_5 \cos(\theta_2) \cos(\theta_5) + 0.5 a_3 a_4 m_4 \cos(\theta_2) \sin(\theta_4) + 0.5 a_5 \cos(\theta_5) \cos(\theta_5) + 0.5 a_5 \cos(\theta_5) \cos
          a_3 a_4 m_5 \cos(\theta_2) \sin(\theta_4) + a_2 \log_{3,2} m_3 \cos(\theta_2) \sin(\theta_3) - 0.5 a_3 \log_{3,3} m_3 \cos(\theta_3) \sin(\theta_2) + a_3 \log_{4,1} m_4 \cos(\theta_2) \sin(\theta_4) - 0.5 m_4 \log_{10} m_5 \cos(\theta_2) \sin(\theta_3) - 0.5 m_5 \log_{10} m_5 \cos(\theta_3) \sin(\theta_4) + a_2 \log_{10} m_5 \cos(\theta_2) \sin(\theta_3) - 0.5 m_5 \log_{10} m_5 \cos(\theta_3) \sin(\theta_3) + a_3 \log_{10} m_5 \cos(\theta_3) \sin(\theta_3) - 0.5 m_5 \log_{10} m_5 \cos(\theta_3) \sin(\theta_3) + a_3 \log_{10} m_5 \cos(\theta_3) 
     a_3 \log_{4.3} m_4 \cos(\theta_3) \sin(\theta_2) - a_3 \log_{5.3} m_5 \cos(\theta_3) \sin(\theta_2) + a_4 \log_{5.2} m_5 \cos(\theta_2) \sin(\theta_5) - \log_{3.1} \log_{3.3} m_3 \cos(\theta_3) \sin(\theta_2) + a_4 \log_{5.2} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_2) + a_4 \log_{5.2} m_5 \cos(\theta_3) \sin(\theta_3) + a_5 \log_{5.2} m_5 \cos(\theta_3) \sin(\theta_3) + a_5 \log_{5.2} m_5 \cos(\theta_3) \sin(\theta_3) + a_5 \log_{5.2} m_5 \cos(\theta_3) 
     lc_{3,2} lc_{3,3} m_3 \sin(\theta_2) \sin(\theta_3) + 2.0 I_{xx,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx,4} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 I_{xx,4} \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \cos(\theta_4) \cos(\theta_5) \cos(\theta_
     2.0 I_{\text{xx},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{\text{xx},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{\text{xx},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{xx},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{xx},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{xx},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{\text{xx},5} \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) + 2.0 I_{\text{xx},5} \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
     2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) + 2.0
     2.0 I_{\text{vv},4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},4} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},6} \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},6} \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},6} \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},6} \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_6) \cos
     2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) \cos(\theta_5)^2 \cos(\theta
     2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_3 \cos(\theta_2) \cos(\theta_3)^2 + a_3 \log_{10} m_3 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_3 \cos(\theta_5) 
     a_4 \ln_{4.2} m_4 \cos(\theta_2) \cos(\theta_3)^2 + a_4 \ln_{4.2} m_4 \cos(\theta_2) \cos(\theta_4)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_2) \cos(\theta_4)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 + a_5 \ln_{5.2} m_5 \cos(\theta_3)^2 + a_5 \ln_{5.2
     a_5 \log_{1.2} m_5 \cos(\theta_2) \cos(\theta_5)^2 - 2.0 \log_{1.1} \log_{1.2} m_3 \cos(\theta_2) \cos(\theta_3)^2 + 2.0 \log_{1.1} \log_{1.2} m_4 \cos(\theta_2) \cos(\theta_3)^2 + 2.0 \log_{1.1} \log_{1.1} \log_{1.2} m_4 \cos(\theta_2) \cos(\theta_3)^2 + 2.0 \log_{1.1} \log_{1
     2.0 \log_{10} \log_{
               a_2 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 a_3 a_5 m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_2 \ln_4 m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 a_5 m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_5 \ln_4 m_4 \cos(\theta_5) \cos(\theta_5
          a_3 \log_{10} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_3 \log_{10} m_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_2 \log_{10} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_3 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{10} m_5 \cos(\theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_5) \cos(\theta_
          a_2 \ln_4 2 m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + a_4 \ln_4 m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4 \ln_4 m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \ln_4 m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_4 \ln_4 m_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_4 \ln_4 m_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_4 \ln_4 m_4 \cos(\theta_3) 
          0.5 a_4 \log_{10} a_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + a_5 \log_{10} a_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - a_3 \log_{10} a_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - a_5 \log_{10} a_5 \cos(\theta_4) \sin(\theta_5) - a_5 \log_{10} a_5 \cos(\theta_5) \cos(\theta_
          a_3 \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_4 \log_{5,3} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + a_5 \log_{5,1} m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
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a_5 \log_{10} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 a_4 m_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 a_4 m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
    0.5 a_3 a_5 m_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - \ln_{4,1} \ln_{4,3} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + a_2 \ln_{4,1} m_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - \ln_{4,1} \ln_{4,1} m_4 \cos(\theta_3) \sin(\theta_4) - \ln_{4,1} \ln_{4,1} m_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) - \ln_{4,1} \ln_{4,1} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_2 \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) - \ln_{4,1} \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) + a_2 \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) - \ln_{4,1} \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) + a_3 \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) + a_4 \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) + a_5 \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) + a_5 \ln_{4,1} m_4 \cos(\theta_5) \sin(\theta_5) + a_5 \ln_{4,1} m_4 \cos(\theta_5) \cos(
    a_3 \ln \log 1 = a_3 
0.5 \, a_4 \, \mathrm{lc}_{4,3} \, m_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_4^{\,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{\,2} \, \sin{(\theta_3)} - 0.5 \, a_4^{\,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{\,2} \, \sin{(\theta_3)} - 0.5 \, a_4^{\,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{\,2} \, \sin{(\theta_3)} - 0.5 \, a_4^{\,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{\,2} \, \sin{(\theta_3)} + 0.5 \, a_4^{\,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{\,2} \, \sin{(\theta_3)} + 0.5 \, a_4^{\,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{\,2} \, \sin{(\theta_3)} + 0.5 \, a_4^{\,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{\,2} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)}
0.5 a_4^2 m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \cos(
0.5 \, a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \cos{(\theta_4)} \, \cos{(\theta_
0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \cos(\theta_5) 
lc_{4,1} lc_{4,3} m_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 2.0 lc_{4,1}^2 m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 lc_{4,1}^2 m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 lc_{4,1}^2 m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta
2.0 \log_{4,2}{}^2 m_4 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \log_{4,2}{}^2 m_4 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{5,1}{}^2 m_5 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 2.0 \log_{5,1}{}^2 \cos{(\theta_4)} \cos{(
2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{3})} \sin{(\theta_{3})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{3})} \cos{(\theta_{
2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{5})^{2}} \sin{(\theta_{3})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{5})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} - 2.0 \log_{5,1}^{2} m_{5} \cos{(\theta_{5})} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(
2.0 \log_{5.1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} - 2.0 \log_{5.1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \cos{(\theta_{4})} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \cos{(\theta_{5})} \cos{(\theta_{
2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,2}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} + a_{4} a_{5} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})} + a_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + a_{5} \cos{(\theta_{5})} \cos{(
a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) - 2.0 a_3 \ln_{4.2} m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) + 2.0 a_4 \ln_{5.1} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) + 2.0 a_5 \ln_{5.2} m_5 \cos(\theta_5) 
2.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} - a_3 \, a_4 \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_3 \, a_4 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_4 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}
2.0 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{lc}
4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{xx,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)
4.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{\text{vv},5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_3) 
2.0 \, a_4 \, \text{lc}_{4,2} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \, a_5 \, \text{lc}_{5,2} \, m_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 -
2.0 a_5 \log_{10} m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 \log_{10} \log_{10} m_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 \log_{10} \log_{10} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 \log_{10} \log_{10} m_5 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 \log_{10} \log_{10} m_5 \cos(\theta_5)^2 \cos(\theta_5)^2 - 4.0 \log_{10} \log_{10} m_5 \cos(\theta_5)^2 \cos(\theta
4.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 - 4.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xv,4} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_5)^2 + 4.0 \log_{1.1} \log_{1.
4.0\,I_{\text{xv},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{3}\right)\,\cos\left(\theta_{4}\right)\,\sin\left(\theta_{3}\right)\,\sin\left(\theta_{4}\right) - 4.0\,I_{\text{xv},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{3}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xv},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{4}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xv},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{4}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xv},5}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xv},5}\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) - 4.0\,I_{\text{xv},5}\,\cos\left(\theta_{5}\right) - 4.0\,I_{\text{xv},5}\,\cos\left(\theta_{5}\right) - 4.0\,I_{\text{xv},5}\,\cos\left
    2.0 \, a_3 \, lc_{4.1} \, m_4 \, cos(\theta_2) \, cos(\theta_3) \, cos(\theta_4) \, sin(\theta_3) + a_2 \, lc_{5.1} \, m_5 \, cos(\theta_2) \, cos(\theta_3) \, cos(\theta_4) \, sin(\theta_5) + a_2 \, lc_{5.1} \, m_5 \, cos(\theta_2) \, cos(\theta_3) \, cos(\theta_4) + a_2 \, lc_{5.1} \, m_5 \, cos(\theta_2) \, cos(\theta_3) \, cos(\theta_4) + a_3 \, lc_{5.1} \, m_5 \, cos(\theta_2) \, cos(\theta_3) 
    a_2 \log_{10} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 \log_{10} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2.0 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta
a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - a_4 a_5 m_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + lc_{5,2} lc_{5,3} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + lc_{5,3} lc_{5,3} m_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,4} lc_{5,5} lc_{5,5} lc_{5,5} m_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,5} lc_{5,5
4.0 a_5 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 a_3 lc_{4,2} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_2 lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_3 lc_{5,2} m_5 \cos(\theta_5) \cos(\theta_
a_2 \ln \log a_2 + \log a_3 + \log a_4 + \log a_4 + \log a_5 
2.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5,3} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5
0.5 a_5 lc_{5,3} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_5 m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 8.0 lc_{5,1} lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 10.0 lc_{5,1} lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 8.0 lc_{5,1} lc_{5,2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
lc_{5,1}lc_{5,3}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5) + lc_{5,1}lc_{5,3}m_5\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4) + lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3) - lc_{5,1}lc_{5,3}m_5\cos(\theta_4)\cos(\theta_5)\sin(\theta_5) + lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\sin(\theta_5) + lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\cos(\theta_5) + lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\cos(\theta_5) + lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + lc_{5,1}lc_{5,3}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos
a_2 \ln l_{5,1} + m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_4) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_4) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_4) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_4) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} \ln l_{5,3} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} + m_5 \cos(\theta_5) \sin(\theta_5) - \ln l_{5,2} + m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
lc_{5,2} lc_{5,3} m_5 cos(\theta_5) sin(\theta_2) sin(\theta_3) sin(\theta_4) + 8.0 I_{xy,5} cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5)^2 sin(\theta_3) sin(\theta_4) + 8.0 I_{xy,5} cos(\theta_2) cos(\theta_3) cos(\theta_5) sin(\theta_5) + 8.0 I_{xy,5} cos(\theta_5) sin(\theta_5) sin(
8.0 I_{xy,5} \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
lc_{5,1} lc_{5,3} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_3 a_5 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) - 2.0 a_3 lc_{5,1} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) - 2.0 a_3 lc_{5,1} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) - 2.0 a_3 lc_{5,1} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) - 2.0 a_3 lc_{5,1} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2.0 a_3 lc_{5,1} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2.0 a_3 lc_{5,1} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta
2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)^2} \, \sin{(\theta_3)} - 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)^2} \, \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)^2} \, \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)^2} \, \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)^2} \, \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)^2} \, \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)^2} \, \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{
2.0 \, a_3 \, \log_2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) + 2.0 \, a_3 \, \log_2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_4) - 2.0 \, a_5 \, \log_3 \log_3 \cos(\theta_3) \cos(
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2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_5)} \, \cos
2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta
a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + a_5^2 m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + a_5^2 m_5 \cos(\theta_5) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_5) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + a_5^2 m_5 \cos(\theta_5) \cos(
4.0 \log_{5.1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} + 4.0 \log_{5.1}^{2} m_{5} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} -
4.0 \log_{5.2}^{2} m_5 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 \log_{5.1}^{2} m_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} -
4.0 \log_{5} 2^{2} m_{5} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) - 4.0 \log_{5} 2^{2} m_{5} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) -
2.0 \, a_4 \, a_5 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) - 4.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5\,2} \, m_5 \, \mathrm{
    a_2 \log_{5.2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_3 a_4 m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) - 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) - 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 2.0 a_3 a_4 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_
0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \cos{(\theta
2.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{lc}_{5,2} \, \mathrm{lc
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4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta
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    2.0 a_5 \log_{12} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 \log_{5,2} m_5 \cos(\theta_5) \cos
4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{lc}_{5,2}
8.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 8.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 8.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5,2} m_5 \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5,2} m_5 \cos(\theta_5) \cos(\theta_5
8.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_5^2 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - a_5^2 m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - a_5^2 m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
4.0 \log_{5,1}^{2} m_{5} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 4.0 \log_{5,2}^{2} m_{5} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 4.0 \log_{5,2}^{2} m_{5} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{5}) + 4.0 \log_{5,2}^{2} m_{5} \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5
    2.0 \, a_4 \, a_5 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, a_4 \, \log_{10} m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) - 4.0 \, \log_{10} m_5 \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (A7)
    4.0 \, a_4 \, lc_5 \, 2 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 4.0 \, a_5 \, lc_5 \, 1 \, m_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5)
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M_{22} = I_{xx,4} + I_{xx,5} + I_{yy,2} + I_{yy,3} + 0.25 a_2^2 m_2 + a_2^2 m_3 + a_2^2 m_4 + 0.25 a_3^2 m_3 + a_2^2 m_5 + a_3^2 m_4 + a_3^2 m_5 + a
    \log_{10}(2^{12} m_2 + \log_{10}(2^{12} m_2 + \log_{10}(2^{12} m_3 + \log_{10}(2^{12} m_3 + \log_{10}(2^{12} m_4 + \log_{1
    I_{\text{xx},4}\cos(\theta_3)^2 - I_{\text{xx},4}\cos(\theta_4)^2 - I_{\text{xx},5}\cos(\theta_3)^2 - I_{\text{xx},5}\cos(\theta_4)^2 - I_{\text{xx},5}\cos(\theta_5)^2 - I_{\text{vv},3}\cos(\theta_3)^2 + I_{\text{vv},4}\cos(\theta_3)^2 + I_{\text{vv},4}\cos(\theta_3)^2 + I_{\text{vv},4}\cos(\theta_3)^2 - I_{\text{xx},5}\cos(\theta_3)^2 
    I_{\text{vv},4}\cos{(\theta_4)^2} + I_{\text{vv},5}\cos{(\theta_3)^2} + I_{\text{vv},5}\cos{(\theta_4)^2} + I_{\text{vv},5}\cos{(\theta_5)^2} + 2.0I_{\text{xx},4}\cos{(\theta_3)^2}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_3)^2}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_3)^2}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_3)^2}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_3)^2}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_3)^2}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_3)^2}\cos{(\theta_4)^2} + 2.0I_{\text{xx},5}\cos{(\theta_4)^2} + 2
    2.0 I_{xx,5} \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 2.0 I_{xx,5} \cos{(\theta_4)^2} \cos{(\theta_5)^2} - 2.0 I_{yy,4} \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 2.0 I_{yy,5} \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 2.0 I_{yy,5} \cos{(\theta_4)^2} - 2.0 I_{yy,5} \cos{(\theta_4)^2} + 2.0 I_{yy,5} \cos{(\theta_5)^2} 
    2.0 \, I_{\text{vv.5}} \cos{(\theta_3)^2} \cos{(\theta_5)^2} - 2.0 \, I_{\text{yv,5}} \cos{(\theta_4)^2} \cos{(\theta_5)^2} - 2.0 \, I_{\text{xy,3}} \cos{(\theta_3)} \sin{(\theta_3)} + 2.0 \, I_{\text{xy,4}} \cos{(\theta_3)} \sin{(\theta_3)} + 2.0 \, I_{\text{xy,4}} \cos{(\theta_3)} \sin{(\theta_3)} + 2.0 \, I_{\text{xy,5}} \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 2.0 \, I_{\text{xy,5}} \cos{(\theta_5)^2} + 2.0 \, I_{\text{xy,5}} \cos{(\theta_5)^2} + 2.0 \, I_{\text{xy,6}} \cos{(\theta_5)^2} + 2.0 \, I_{\text{xy,7}} \cos{(\theta_5)^2} + 2.0 \, 
    2.0 \, I_{\text{xv}.5} \cos{(\theta_3)} \sin{(\theta_3)} + 2.0 \, I_{\text{xv}.4} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, I_{\text{xv}.5} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, I_{\text{xv},5} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 \, \text{lc}_{2,1} \, m_2 + a_3 \, \text{lc}_{2,1} \, m_3 + a_4 \, \text{lc}_{2,1} \, 
    a_3 \log_{11} m_3 - 0.25 a_3^2 m_3 \cos(\theta_3)^2 - a_3^2 m_4 \cos(\theta_3)^2 - a_3^2 m_5 \cos(\theta_3)^2 + 0.25 a_4^2 m_4 \cos(\theta_3)^2 + 0.25 a_4^2 m_4 \cos(\theta_4)^2 + 0.25 a_4^
    a_4^2 m_5 \cos(\theta_3)^2 + a_4^2 m_5 \cos(\theta_4)^2 + 0.25 a_5^2 m_5 \cos(\theta_3)^2 + 0.25 a_5^2 m_5 \cos(\theta_4)^2 + 0.25 a_5^2 m_5 \cos(\theta_5)^2 - \log_3 \frac{1}{2} m_3 \cos(\theta_3)^2 + 0.25 a_5^2 m_5 \cos(\theta_5)^2 +
    \log_{3.2}^2 m_3 \cos(\theta_3)^2 + \log_{4.1}^2 m_4 \cos(\theta_3)^2 + \log_{4.1}^2 m_4 \cos(\theta_4)^2 - \log_{4.2}^2 m_4 \cos(\theta_3)^2 - \log_{4.2}^2 m_4 \cos(\theta_4)^2 + \log_{5.1}^2 m_5 \cos(\theta_3)^2 + \log_{5.1}^2 m_5 \cos(\theta_3
     \log_{10}^{12} \log_{
    2.0 \log_{4.2}^2 m_4 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 2.0 \log_{5.1}^2 m_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 2.0 \log_{5.1}^2 m_5 \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 2.0 \log_{5.2}^2 m_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 2.0 \log_{5.2}^2 m_5 \cos{(\theta_5)^2} + 2.0 \log_{5.2}^2 m_
    2.0 \log_{5} \frac{1}{2} m_{5} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} + 2.0 \log_{5} \frac{2}{2} m_{5} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})^{2}} + 2.0 \log_{5} \frac{2}{2} m_{5} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} + 2.0 \log_{5} \frac{2}{2} m_{5} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} + 2.0 \log_{5} \frac{2}{2} m_{5} \cos{(\theta_{5})^{2}} + 2.0 \log_{5} \frac{2}{2
    4.0 I_{\text{VV}} = \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_3 a_4 m_4 \cos(\theta_4) + 2.0 a_3 a_4 m_5 \cos(\theta_4) + 2.0 a_2 \log_3 m_3 \cos(\theta_3) + 2.0 a_3 \log_4 m_4 \cos(\theta_4) + 2.0 \log_3 m_5 \cos(\theta_5) + 2.0 \log_3 m_5 \cos
    a_2 a_3 m_3 \sin(\theta_3) + 2.0 a_2 a_3 m_4 \sin(\theta_3) + 2.0 a_2 a_3 m_5 \sin(\theta_3) + 2.0 a_2 \log_{11} m_3 \sin(\theta_3) - 2.0 a_3 \log_{12} m_4 \sin(\theta_4) - 2.0 \log_{11} m_4 \sin(\theta_4) + 2.0 \log_{11} m_4 \cos(\theta_4) + 2.0 \log_{11} m_4 \cos(\theta_4)
    4.0 I_{xy,4} \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 4.0 I_{xy,4} \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 I_{xy,5} \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 4.0 I_{xy,5} \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{xy,5} \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 4.0 I_{xy,5} \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_
    4.0 \, I_{\text{xv}.5} \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 4.0 \, I_{\text{xv}.5} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 4.0 \, I_{\text{xy},5} \cos{(\theta_5)} \sin{(\theta_5)} - 4.0 \, I_{\text{xy},5} \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 4.0 \, I_{\text{xy},5} \cos{(\theta_5)} \cos{(\theta_5
    a_3 \log_{3.1} m_3 \cos(\theta_3)^2 + a_4 \log_{4.1} m_4 \cos(\theta_3)^2 + a_4 \log_{4.1} m_4 \cos(\theta_4)^2 + a_5 \log_{5.1} m_5 \cos(\theta_3)^2 + a_5 \log_{5.1} m_5 \cos(\theta_4)^2 + a_5 \log_{5.1} m_5 \cos(\theta_5)^2 + a_5 \log_{5.1} m_5 \cos(\theta
    a_5 \log_{10} m_5 \cos(\theta_5)^2 - 0.5 a_4^2 m_4 \cos(\theta_3)^2 \cos(\theta_4)^2 - 2.0 a_4^2 m_5 \cos(\theta_3)^2 \cos(\theta_4)^2 - 0.5 a_5^2 m_5 \cos(\theta_5)^2 \cos(\theta
0.5 a_5^2 m_5 \cos(\theta_3)^2 \cos(\theta_5)^2 - 0.5 a_5^2 m_5 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_4 \ln_4 m_4 \cos(\theta_3)^2 \cos(\theta_4)^2 - 2.0 a_5 \ln_5 m_5 \cos(\theta_3)^2 \cos(\theta_4)^2 - 2.0 a_5 \ln_5 m_5 \cos(\theta_3)^2 \cos(\theta_4)^2 - 2.0 a_5 \ln_5 m_5 \cos(\theta_5)^2 - 2.0 a
    2.0 a_5 \log_{10} m_5 \cos(\theta_3)^2 \cos(\theta_5)^2 - 2.0 a_5 \log_{10} m_5 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 I_{xx,4} \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{10} m_5 \cos(\theta_5)^2 
2.0 I_{xx,5} \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xx,5} \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_4) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \cos(\theta_5) \cos(\theta
    2.0 I_{vv,4} \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{vv,5} \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{vv,5} \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{vv,5} \cos(\theta_5) 
    2.0 I_{\text{VV}} = \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10}^2 m_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 \log_{10}^2 m_5 \cos(\theta_5)^2 \cos(\theta_5)
    4.0 \ln z^2 m_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 a_2 \ln a_2 \cos(\theta_3) \cos(\theta_4) - 2.0 a_3 \ln z_2 m_5 \cos(\theta_4) \cos(\theta_5) + a_2 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + a_3 \ln a_5 \cos(\theta_5) \cos(\theta_5) + a_4 \ln a_5 \cos(\theta_5) \sin(\theta_5) + a_5 \ln a_5 \cos(\theta_5) \cos(\theta_5)
         a_2 a_4 m_4 \cos(\theta_4) \sin(\theta_3) + 2.0 a_2 a_4 m_5 \cos(\theta_3) \sin(\theta_4) + 2.0 a_2 a_4 m_5 \cos(\theta_4) \sin(\theta_3) - a_3 a_5 m_5 \cos(\theta_4) \sin(\theta_5) - a_5 \cos(\theta_4) \sin(\theta_5) = 0
         a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_4) + a_3 \log_2 m_3 \cos(\theta_3) \sin(\theta_3) + 2.0 a_2 \log_4 m_4 \cos(\theta_3) \sin(\theta_4) + 2.0 a_2 \log_4 m_4 \cos(\theta_4) \sin(\theta_3) - 2.0 \log_4 m_4 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_4 m_4 \cos(\theta_4) \cos
         a_4 \ln a_2 + a_4 \cos(\theta_3) \sin(\theta_3) - a_4 \ln a_2 + a_4 \cos(\theta_4) \sin(\theta_4) - 2.0 a_3 \ln a_5 + a_5 \cos(\theta_4) \sin(\theta_5) - 2.0 a_3 \ln a_5 + a_5 \cos(\theta_5) \sin(\theta_4) - 2.0 a_5 \ln a_5 \cos(\theta_5) \sin(\theta_4) - 2.0 a_5 \ln a_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 \ln a_5 \cos(\theta_5) 
         a_5 \log_2 m_5 \cos(\theta_3) \sin(\theta_3) - a_5 \log_2 m_5 \cos(\theta_4) \sin(\theta_4) - a_5 \log_2 m_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_4 \log_2 m_3 \cos(\theta_3) \sin(\theta_3) - 2.0 \log_4 \log_4 m_5 \cos(\theta_4) \sin(\theta_4) - 2.0 \log_4 \log_4 m_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_4 \log_5 m_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_4 m_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_4 m_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_5 m_5 \cos(\theta_5) \cos(\theta_5
    2.0 \log_{4,1} \log_{4,2} m_4 \cos{(\theta_3)} \sin{(\theta_3)} - 2.0 \log_{4,1} \log_{4,2} m_4 \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{5,1} \log_{5,2} m_5 \cos{(\theta_3)} \sin{(\theta_3)} - 2.0 \log_{5,1} \log_{5,2} m_5 \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{5,2} m_5 \cos{(\theta_4)} \cos{(\theta_4
2.0 \log_{11} \log_{12} m_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_2 \log_{12} m_4 \sin(\theta_3) \sin(\theta_4) + 2.0 a_3 \log_{12} m_5 \sin(\theta_4) \sin(\theta_5) - a_3 a_4 m_4 \cos(\theta_3)^2 \cos(\theta_4) - a_4 \log_{12} m_5 \cos(\theta_5) \sin(\theta_5) - a_5 \log_{12} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \log_{12} m_5 \cos(\theta_5) \cos(\theta
    2.0 \, a_3 \, a_4 \, m_5 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} - 2.0 \, a_3 \, \mathrm{lc_{4,1}} \, m_4 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_3)}^2 \, \cos{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} + 2.0 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} + 2.0 \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} + 2.0 \, \mathrm{lc_{5,2}} \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} + 2.0 \, \mathrm{lc_{5,2}} \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} + 2.0 \, \mathrm{lc_{5,2}} \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} + 2.0 \, \mathrm{lc_{5,2}} \, \mathrm{lc_{5,2}} \, m_5 \cos{(\theta_5)} + 2.0 \, \mathrm{lc_{5,2}} \, \mathrm{l
    a_4 a_5 m_5 \cos(\theta_3)^2 \sin(\theta_5) - a_4 a_5 m_5 \cos(\theta_4)^2 \sin(\theta_5) + 2.0 a_3 \log_4 2 m_4 \cos(\theta_3)^2 \sin(\theta_4) - 2.0 a_4 \log_{10} m_5 \cos(\theta_3)^2 \sin(\theta_5) - a_4 \log_{10} m_5 \cos(\theta_4)^2 \sin(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_5) + a_5 \log_{10} \log_{10} m_5 \cos(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_5) + a_5 \log_{10} m_5 \cos(
    2.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \cos{(\theta_4)}^2 \sin{(\theta_5)} + 8.0 \, I_{xv,5} \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 8.0 \, I_{xv,5} \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 8.0 \, I_{xv,5} \cos{(\theta_5)}^2 \sin{(\theta_5)} + 8.0 \, I_{xv,5} \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}
    8.0 I_{xy.5} \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_4^2 m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 a_4^2 m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 a_4^2 m_5 \cos(\theta_4) \sin(\theta_5) + 2.0 a_4^2 m_5 \cos(\theta_5) \sin(\theta_5) + 2.0 a_4^2 m_5 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5^2 m_5 \cos(\theta_5) 
    0.5 a_5^2 m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5^2 m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5^2 m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \cos(\theta_5) \cos(\theta_5)
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a_{2} a_{5} m_{5} \cos (\theta_{3}) \cos (\theta_{4}) \cos (\theta_{5}) + 2.0 \lg_{4,1}{}^{2} m_{4} \cos (\theta_{3}) \cos (\theta_{4}) \sin (\theta_{3}) \sin (\theta_{4}) - 2.0 \lg_{4,2}{}^{2} m_{4} \cos (\theta_{3}) \cos (\theta_{4}) \sin (\theta_{3}) \sin (\theta_{4}) + 2.0 \lg_{5,1}{}^{2} m_{5} \cos (\theta_{3}) \cos (\theta_{4}) \sin (\theta_{3}) \sin (\theta_{4}) - 2.0 \lg_{5,2}{}^{2} m_{5} \cos (\theta_{3}) \cos (\theta_{4}) \sin (\theta_{3}) \sin (\theta_{4}) + 2.0 \lg_{5,1}{}^{2} m_{5} \cos (\theta_{3}) \cos (\theta_{4}) \sin (\theta_{3}) \sin (\theta_{5}) - 2.0 \lg_{5,1}{}^{2} m_{5} \cos (\theta_{5}) \sin (\theta_{5}) + 2.0 \lg_{5
    2.0 \log_{5,2}{^2} m_5 \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,1}{^2} m_5 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} - 2.0 \log_{5,2}{^2} m_5 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{^2} m_5 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{^2} m_5 \cos{(\theta_5)} 
    2.0 a_2 \log_{1.1} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_4 a_5 m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) - a_4 a_5 m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + a_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
    2.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_2 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 2.0 \, a_2 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) + 2.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 2.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta
    2.0 a_2 \ln_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 \ln_{5,1} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 \ln_{5,1} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 2.0 a_2 \ln_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
    a_3 a_4 m_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 a_3 a_4 m_5 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_5) - a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_5) - a_3 a_4 m_5 \cos(\theta_5) \sin(\theta_5) - a_3 a_4 m_5 \cos(\theta_5) \sin(\theta_5) - a_3 a_5 \cos(\theta_5) \sin(\theta_5) - a_4 a_5 \cos(\theta_5) \sin(\theta_5) - a_5 \cos(\theta_5) \cos(\theta_5
    a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 4.0 a_5 \ln \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) + 2.0 a_3 \ln a_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 1.0 \cos(\theta_5) \sin(\theta_5) \sin(\theta
2.0 a_2 \ln \ln m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 2.0 a_2 \ln m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 2.0 a_2 \ln m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 a_2 \ln m_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_2 \ln m_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_2 \ln m_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 \ln m_5 \cos(\theta_5) \cos(\theta
2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \mathrm{lc}_{5,2} \, m_5
4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)\,\cos\left(\theta_{4}\right)\,\cos\left(\theta_{5}\right)^{2}\,\sin\left(\theta_{3}\right)\,\sin\left(\theta_{4}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)\,\cos\left(\theta_{4}\right)^{2}\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{3}\right)\,\sin\left(\theta_{5}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)^{2}\,\cos\left(\theta_{4}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{4}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)^{2}\,\cos\left(\theta_{4}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)^{2}\,\cos\left(\theta_{4}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)^{2}\,\cos\left(\theta_{4}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)^{2}\,\cos\left(\theta_{4}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{3}\right)\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{5}\right)\,\sin\left(\theta_{5}\right) + 4.0\,I_{\text{xx},5}\,\cos\left(\theta_{5}\right)\,\sin\left
    2.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right) + a_3 \, a_5 \, m_5 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_5\right) + a_3 \, a_5 \, m_5 \cos \left(\theta_3\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_4\right) + a_3 \, a_5 \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + a_3 \, a_5 \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + a_3 \, a_5 \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + a_5 \, a_5 \, a_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + a_5 \, a_5 \cos \left(\theta_5\right) \cos \left(\theta_5\right) \cos \left(\theta_5\right) \cos \left(\theta_5\right) + a_5 \, a_5 \cos \left(\theta_5\right) \cos \left(\theta_5\right
2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \cos{(\theta_5)}^2 \cos{(\theta_5
    2.0 a_3 lc_{5,1} m_5 cos(\theta_3)^2 cos(\theta_5) sin(\theta_4) + 2.0 a_5 lc_{5,2} m_5 cos(\theta_3) cos(\theta_4)^2 sin(\theta_3) + 2.0 a_5 lc_{5,2} m_5 cos(\theta_3) cos(\theta_5)^2 sin(\theta_3) cos(\theta_5)^2 sin(\theta_3) + 2.0 a_5 lc_{5,2} m_5 cos(\theta_3) cos(\theta_5)^2 sin(\theta_3) + 2.0 a_5 lc_{5,2} m_5 cos(\theta_3) cos(\theta_5)^2 sin(\theta_3) cos(\theta_5)^2 sin(\theta_5)^2 sin(\theta_5
    2.0 a_5 \log_{10} m_5 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 a_5 \log_{10} m_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 \log_{10} m_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{10} m_5 \cos(\theta_5) \cos(\theta
    2.0 a_5 \log_{10} m_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 \log_{11} \log_{12} m_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 4.0 \log_{11} \log_{12} m_4 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{11} \log_{12} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{11} \log_{11} \log_{12} m_5 \cos(\theta_5) \cos(\theta
    4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 \log_{5,1} \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5,2} m_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5,2} m_5 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 \log_{5,2} m_5 \cos(\theta_5)^2 \cos(\theta_5
    4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \cos (\theta_5) \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_4)^2 \cos (\theta_5) \sin (\theta_5) - 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_4)^2 \cos (\theta_5) \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \sin (\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \cos (\theta_5)^2 \sin (\theta_5) + 4.0 \log_{5.2} m_5 \cos (\theta_5)^2 \cos (\theta
    2.0 \, a_3 \, \log_{12} m_5 \cos{(\theta_3)^2} \sin{(\theta_4)} \sin{(\theta_5)} + 4.0 \, a_4 \, \log_{12} m_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} + 2.0 \, a_4 \, a_5 \, m_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_5)} + 2.0 \, a_5 \, \log_{12} m_5 \cos{(\theta_5)} + 2.0 \, \alpha_5 \, \log_{12} m_5 \cos{(\theta_5)} + 2.0 \, \alpha_5
    4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_5)} + 2.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \cos
2.0 \, a_3 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) - 2.0 \, a_3 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) - 2.0 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) \, a_5 \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, a_5 \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, a_5 \, m_5 \, \cos(\theta_5) \, a_5 \, m_5 \, \cos(\theta_5) \, a_5 \, m_5 \, a_5 \, a_5 \, m_5 \, a_5 \,
    2.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - a_5^2 \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - a_5^2 \, m_5 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_5^2 \, m_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_5^2 \, m_5 \, \cos{(\theta_5)} \, \cos
    a_{5}^{2} m_{5} \cos (\theta_{3})^{2} \cos (\theta_{4}) \cos (\theta_{5}) \sin (\theta_{4}) \sin (\theta_{5}) - 4.0 \ln 2 \cos (\theta_{3}) \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{3}) \sin (\theta_{4}) - 4.0 \ln 2 \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) + 4.0 \ln 2 \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \cos (\theta_{5}) 
    4.0 \log_{5.2}^2 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4.0 \log_{5.1}^2 m_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^2 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^2 m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
4.0 \log_{5.2}^{2} m_5 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \cos(\theta_5) \cos(\theta_
2.0 \, a_4 \, a_5 \, m_5 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, a_5 \, m_5 \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, a_5 \, m_5 \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, a_5 \, m_5 \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, a_5 \, m_5 \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, a_5 \, m_5 \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, a_5 \, m_5 \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_5 \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5
    4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right) \sin \left(\theta_4\right) - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_3\right) \cos \left(\theta_4\right)^2 \sin \left(\theta_5\right) - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_5\right) - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_5\right) - 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \cos \left(\theta_5\right) \sin \left(\theta_5\right) 
    4.0 a_5 l_{5,2} m_5 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 a_5 l_{5,2} m_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 a_5 l_{5,2} m_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 l_{5,2} m_5 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) - 4.0 a_5 l_{5,2} m_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 4.0 a_5 l_{5,2} m_5 \cos(\theta_5)^2 \sin(\theta_5) - 4.0 a_5 l_{5,2} m_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 4.0 a_5 l_{5,2} m_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin
8.0 \log_{10} \log_{
8.0 I_{xy.5} \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 4.0 a_4 lc_{5.1} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 lc_{5.1} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
    4.0 a_5 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4.0 a_5 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
    4.0 a_5 \log_{10} m_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_4 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 4.0 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_4 \log_{10} m_5 \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_4) - 4.0 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) 
    2.0 \, a_4 \, a_5 \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) + 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5
         8.0 \log_{1.1} \log_{1.2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (A8)
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 \begin{aligned} & M_{23} = I_{\text{yz},3} \sin \left(\theta_{3}\right) - I_{\text{xz},3} \cos \left(\theta_{3}\right) - I_{\text{xz},4} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) + I_{\text{yz},4} \cos \left(\theta_{3}\right) \sin \left(\theta_{4}\right) + I_{\text{yz},4} \cos \left(\theta_{4}\right) \sin \left(\theta_{3}\right) + I_{\text{xz},5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{3}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) + I_{\text{xz},5} \cos \left(\theta_{3}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) - I_{\text{yz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) - I_{\text{yz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) - I_{\text{yz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) - I_{\text{yz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) + I_{\text{xz},5} \sin \left(\theta_{5}\right) \sin \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_
```

 $M_{24} = I_{yz,4} \cos{(\theta_3)} \sin{(\theta_4)} - I_{xz,4} \cos{(\theta_3)} \cos{(\theta_4)} + I_{yz,4} \cos{(\theta_4)} \sin{(\theta_3)} + I_{xz,4} \sin{(\theta_3)} \sin{(\theta_4)} + I_{yz,5} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} + I_{xz,5} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_5)} + I_{xz,5} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_4)} + I_{xz,5} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} - I_{yz,5} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - I_{yz,5} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} - I_{xz,5} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 0.5 a_4 \log_4 a_4 \cos{(\theta_3)} \cos{(\theta_4)} + a_4 \log_5 a_5 \cos{(\theta_3)} \cos{(\theta_4)} + l_{xx,5} \sin{(\theta_3)} \sin{(\theta_4)} - l_{xx,5} \cos{(\theta_3)} \cos{(\theta_4)} + a_4 \log_5 a_5 \cos{(\theta_3)} \cos{(\theta_4)} + l_{xx,5} \cos{(\theta_3)} \cos{(\theta_4)} - l_{xx,5} \sin{(\theta_3)} \sin{(\theta_4)} - l_{xx,5} \sin{(\theta_4)} - l_{xx,5} \sin{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} - l_{xx,5} \sin{(\theta_4)} - l_{xx,5} \sin{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} - l_{xx,5} \sin{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} - l_{xx,5} \sin{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} - l_{xx,5} \sin{(\theta_4)} \sin{(\theta_5)} - l_{xx,5} \sin{(\theta_4)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5$

(A9)

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M_{25} = I_{yz,5} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} + I_{xz,5} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_5)} + I_{xz,5} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_4)} + I_{xz,5} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} - I_{yz,5} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - I_{yz,5} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} - I_{xz,5} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - I_{zz,5} \cos{(\theta_5)} \sin{(\theta_4)} \cos{(\theta_5)} \cos{(\theta_
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M_{31} = I_{yz,4} \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - I_{zz,4} \sin(\theta_2) - I_{zz,5} \sin(\theta_2) - I_{yz,3} \cos(\theta_2) \cos(\theta_3) - I_{xz,3} \cos(\theta_2) \sin(\theta_3) - I_{zz,4} \sin(\theta_3) - I_{zz,5} 
0.25\,a_3^2\,m_3\,\sin{(\theta_2)} - a_3^2\,m_4\,\sin{(\theta_2)} - a_3^2\,m_5\,\sin{(\theta_2)} - a_3^2\,m_5\,\sin{(\theta_2)} - 0.25\,a_4^2\,m_4\,\sin{(\theta_2)} - a_4^2\,m_5\,\sin{(\theta_2)} - 0.25\,a_5^2\,m_5\,\sin{(\theta_2)} - 1\,c_{3,1}^2\,m_3\,\sin{(\theta_2)} - 1\,c_{3,2}^2\,m_3\,\sin{(\theta_2)} - 1\,c_{4,1}^2\,m_4\,\sin{(\theta_2)} - 1\,c_{4,2}^2\,m_4\,\sin{(\theta_2)} - 1\,c_{5,1}^2\,m_5\,\sin{(\theta_2)} - 1\,c_{5,2}^2\,m_5\,\sin{(\theta_2)} - 1\,c_{5,2}^2\,m_5^2\,\sin{(\theta_2)} - 1\,c_{5,2}^2\,m_5^2\,m_5^2\,\sin{(\theta_2)} - 1\,c_{5,2}^2\,m_5^2\,\sin{(\theta_2)} - 1\,c_{5,2}^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,m_5^2\,
    I_{\text{vz},4}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\cos\left(\theta_{4}\right)-I_{\text{xz},4}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{4}\right)-I_{\text{xz},4}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{3}\right)-I_{\text{zz},3}\sin\left(\theta_{2}\right)+a_{1}\log_{2}m_{3}\cos\left(\theta_{3}\right)+a_{2}\log_{2}m_{3}\cos\left(\theta_{3}\right)\cos\left(\theta_{3}\right)\cos\left(\theta_{3}\right)\cos\left(\theta_{4}\right)
    0.5 \, a_1 \, a_3 \, m_3 \, \sin{(\theta_3)} + a_1 \, a_3 \, m_4 \, \sin{(\theta_3)} + a_1 \, a_3 \, m_5 \, \sin{(\theta_3)} + a_1 \, \log_{3,1} \, m_3 \, \sin{(\theta_3)} - a_3 \, \log_{3,1} \, m_3 \, \sin{(\theta_2)} - a_4 \, \log_{4,1} \, m_4 \, \log_{4,1} \, 
    a_5 \lg_{5,1} m_5 \sin(\theta_2) - I_{xz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \lg_{3,1} m_3 \sin(\theta_3) \sin(\theta_2) + a_3 \lg_{4,2} m_4 \sin(\theta_4) \sin(\theta_2) + a_5 \lg_{5,1} m_5 \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
    a_4 \log_{10} a_5 \sin(\theta_5) \sin(\theta_2) + I_{vz.5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + I_{vz.5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + I_{vz.5} \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) + I_{vz.5} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_
    I_{xz,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{3}\right)\sin\left(\theta_{4}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{4}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{2}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{4}\right)-I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta_{5}\right)\sin\left(\theta_{5}\right)+I_{xz,5}\cos\left(\theta
    I_{\text{vz.5}}\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.25\,a_2\,a_3\,m_3\cos(\theta_2)\cos(\theta_3) + 0.5\,a_2\,a_3\,m_4\cos(\theta_2)\cos(\theta_3) + 0.5\,a_2\,a_3\,m_5\cos(\theta_2)\cos(\theta_3) + 0.5\,a_2\,a_3\,m_5\cos(\theta_2)\cos(\theta_3) + 0.5\,a_2\,a_3\,m_5\cos(\theta_2)\cos(\theta_3) + 0.5\,a_2\,a_3\,m_5\cos(\theta_3)\cos(\theta_3) + 0.5\,a_2\,a_3\,m_5\cos(\theta_3)\cos(\theta_3)\cos(\theta_3) + 0.5\,a_2\,a_3\,m_5\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_
    0.5 a_2 \log_{11} m_3 \cos(\theta_2) \cos(\theta_3) + a_1 \log_{12} m_4 \cos(\theta_3) \cos(\theta_4) - a_3 \log_{12} m_4 \cos(\theta_2) \cos(\theta_4) - a_4 \log_{12} m_5 \cos(\theta_2) \cos(\theta_5) + a_1 \log_{12} m_4 \cos(\theta_3) \cos(\theta_4) - a_3 \log_{12} m_4 \cos(\theta_2) \cos(\theta_4) - a_4 \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) + a_1 \log_{12} m_4 \cos(\theta_3) \cos(\theta_4) - a_3 \log_{12} m_4 \cos(\theta_3) \cos(\theta_4) - a_4 \log_{12} m_5 \cos(\theta_3) \cos(\theta_4) - a_5 \log_{12} m_5 \cos(\theta_4) - a_5 \log_{12} m_5 \cos(\theta_4) - a_5 \log_{12} m_5 \cos(\theta_5) 
         0.5 a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + 0.5 a_1 a_4 m_4 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) - a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) - a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \cos
         0.5 \, a_3 \, a_4 \, m_4 \, \cos(\theta_2) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \cos(\theta_4) \, \sin(\theta_2) - a_3 \, a_4 \, m_5 \, \cos(\theta_2) \, \sin(\theta_4) - a_3 \, a_4 \, m_5 \, \cos(\theta_4) \, \sin(\theta_2) + a_4 \, \sin(\theta_2) + a_4 \, \sin(\theta_3) + a_4 \, \sin(\theta_4) + a_5 \, \cos(\theta_4) 
         \log_{3} \log_{3} \log_{3} \log_{3} \log_{4} \log_{3} \log_{4} \log_{3} \log_{4} \log_{3} \log_{4} \log_{4
         0.25 \, a_3 \, \mathrm{lc}_{3.3} \, m_3 \, \cos(\theta_3) \, \sin(\theta_2) + a_1 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_3) \, \sin(\theta_4) + a_1 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_3) - a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_2) \, \sin(\theta_4) - a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \cos(\theta_4) \, \sin(\theta_4) + a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \mathrm{lc}_{
         a_3 \log_{10} a_4 \log_{10} a_4 \cos(\theta_4) \sin(\theta_2) + a_3 \log_{10} a_4 \cos(\theta_2) \sin(\theta_3) + a_3 \log_{10} a_5 \cos(\theta_2) \sin(\theta_3) + a_4 \log_{10} a_5 \cos(\theta_2) \sin(\theta_5) + a_5 \log_{10} a_5 \cos(\theta_2) \sin(\theta_5) + a_5 \log_{10} a_5 \cos(\theta_5) \cos(\theta_
         a_4 \ln a_5 = a_5 \cos(\theta_5) \sin(\theta_2) - 0.25 a_2 a_3 m_3 \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_3 m_4 \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_3 m_5 \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_3 m_5 \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_3 m_5 \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) + 0.5 a_2 a_3 m_5 \sin(\theta_3) \cos(\theta_3) \cos(\theta_3)
         a_4 a_5 m_5 \sin(\theta_2) \sin(\theta_5) + \ln_3 \ln_3 \cos(\theta_2) \sin(\theta_3) - 0.5 a_2 \ln_3 m_3 \sin(\theta_2) \sin(\theta_3) - a_1 \ln_4 m_4 \sin(\theta_3) \sin(\theta_4) + a_2 m_5 \sin(\theta_2) \sin(\theta_3) - a_3 \ln_4 m_5 \sin(\theta_3) \sin(\theta_4) + a_4 m_5 m_5 \sin(\theta_2) \sin(\theta_3) - a_4 \ln_4 m_5 \sin(\theta_3) \sin(\theta_3) - a_4 \ln_4 m_5 \sin(\theta_3) \sin(\theta_3) - a_5 \ln_4 m_5 \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3)
         a_3 \log_4 2 m_4 \sin(\theta_2) \sin(\theta_4) + a_4 \log_1 m_5 \sin(\theta_2) \sin(\theta_5) - 0.25 a_2 a_3 m_3 \cos(\theta_3) \cos(\theta_2) - 0.5 a_2 a_3 m_4 \cos(\theta_3) \cos(\theta_2) - 0.5 a_3 a_4 \cos(\theta_3) \cos(\theta_3
         0.5 a_2 a_3 m_5 \cos(\theta_3) \cos(\theta_2) - 0.5 a_2 \log_1 m_3 \cos(\theta_3) \cos(\theta_2) + a_3 \log_2 m_4 \cos(\theta_4) \cos(\theta_2) + a_4 \log_1 m_5 \cos(\theta_5) \cos(\theta_2) - a_5 \log_1 m_5 \cos(\theta_5) \cos
         0.5 \, a_3 \, a_4 \, m_4 \, \cos(\theta_4) \, \sin(\theta_2) + 0.5 \, a_3 \, a_4 \, m_4 \, \sin(\theta_4) \, \cos(\theta_2) - a_3 \, a_4 \, m_5 \, \cos(\theta_4) \, \sin(\theta_2) + a_3 \, a_4 \, m_5 \, \sin(\theta_4) \, \cos(\theta_2) - a_5 \, a_4 \, m_5 \, \cos(\theta_4) \, \sin(\theta_2) + a_5 \, a_5 \, \sin(\theta_4) \, \cos(\theta_2) - a_5 \, a_5 \, a_5 \, \cos(\theta_4) \, \sin(\theta_2) + a_5 \, a_5 \, \cos(\theta_4) \, \sin(\theta_2) + a_5 \, a_5 \, \cos(\theta_4) \, \sin(\theta_2) + a_5 \, a_5 \, \cos(\theta_4) \, \cos(\theta_
         0.5\,a_2\,\mathrm{lc_{3.2}}\,m_3\,\cos{(\theta_3)}\,\sin{(\theta_2)} + 0.5\,a_2\,\mathrm{lc_{3.2}}\,m_3\,\sin{(\theta_3)}\,\cos{(\theta_2)} - 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\cos{(\theta_3)}\,\sin{(\theta_2)} + 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\sin{(\theta_3)}\,\cos{(\theta_2)} - 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\sin{(\theta_3)}\,\cos{(\theta_2)} - 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\sin{(\theta_3)}\,\cos{(\theta_2)} + 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\sin{(\theta_3)}\,\cos{(\theta_2)} - 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\sin{(\theta_3)}\,\cos{(\theta_2)} + 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\cos{(\theta_3)}\,\sin{(\theta_3)}\,\cos{(\theta_2)} + 0.25\,a_3\,\mathrm{lc_{3.3}}\,m_3\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_3)}\,\cos{(\theta_
         a_3 \log_{10} m_4 \cos(\theta_4) \sin(\theta_2) + a_3 \log_{10} m_4 \sin(\theta_4) \cos(\theta_2) + a_4 \log_{10} m_5 \cos(\theta_5) \sin(\theta_2) - a_4 \log_{10} m_5 \sin(\theta_5) \cos(\theta_2) - a_5 \log(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
         0.25 a_2 a_3 m_3 \sin(\theta_3) \sin(\theta_2) - 0.5 a_2 a_3 m_4 \sin(\theta_3) \sin(\theta_2) - 0.5 a_2 a_3 m_5 \sin(\theta_3) \sin(\theta_2) + 0.5 a_1 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 a_3 m_5 \sin(\theta_3) \sin(\theta_2) - 0.5 a_2 a_3 m_5 \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 a_3 m_5 \sin(\theta_3) \cos(\theta_3) \cos(\theta_
         a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + \log_{10} \log_{10} m_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_2 \log_{10} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + a_2 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_2 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) + a_3 \log_{10} m_5 \cos(\theta_5) \cos(
         0.5 a_4 lc_{4.3} m_4 cos(\theta_2) cos(\theta_3) sin(\theta_4) + 0.5 a_4 lc_{4.3} m_4 cos(\theta_2) cos(\theta_4) sin(\theta_3) - a_1 lc_{5.2} m_5 cos(\theta_3) cos(\theta_4) sin(\theta_5) - a_1 lc_{5.2} m_5 cos(\theta_4) sin(\theta_5) - a_1 lc_{5.2} m_5 cos(\theta_5) cos(\theta_5)
         a_1 \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 2.0 a_3 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 2.0 a_3 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 2.0 a_3 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2.0 a_5 \log_{5.2} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
         a_4 \log_{10} a_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{10} a_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 0.5 a_5 a_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
         0.5 \, a_2 \, a_4 \, m_4 \, \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - a_2 \, a_4 \, m_5 \, \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - a_2 \, a_4 \, m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 0.5 \, a_1 \, a_5 \, m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \, a_4 \, m_5 \cos(\theta_4) \sin(\theta_5) - a_3 \, a_4 \, m_5 \cos(\theta_5) \sin(\theta_5) - a_4 \, a_5 \, m_5 \cos(\theta_5) \sin(\theta_5) - a_5 \, a_5 \, m_5 \cos(\theta_5) \cos(\theta_
         0.5 a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_3 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_5 a_5 a_5 \cos(\theta_4) \sin(\theta_5) + a_5 a_5 a_5 \cos(\theta_5) \sin(\theta_5) + a_5 a_5 \cos(\theta_5) 
         lc_{41}lc_{43}m_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)+lc_{41}lc_{43}m_4\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)-a_2lc_{41}m_4\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)-a_2lc_{43}m_4\cos(\theta_3)\sin(\theta_4)
         a_2 \ln a_1 + a_2 \ln a_2 \ln a_3 + a_4 \ln a_4 + a_5 \ln a_5 
         2.0 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_5) + 2.0 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos(\theta_5) \, \sin(\theta_2) \, \sin(\theta_4) - \mathrm{lc}_{4 \, 2} \, \mathrm{lc}_{4 \, 3} \, m_4 \, \cos(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, \mathrm{lc}_{4 \, 2} \, \mathrm{lc}_{4 \, 3} \, m_4 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, \mathrm{lc}_{4 \, 2} \, \mathrm{lc}_{4 \, 3} \, m_4 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 2.0 \, \mathrm{lc}_{4 \, 3} \, \mathrm{lc}_{5 \, 1} \, m_5 \, \cos(\theta_4) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5)
         a_2 \ln_4 2m_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_1 \ln_5 2m_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 2.0 a_3 \ln_5 2m_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_1 \ln_5 2m_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \ln_5 2m_5 \sin(\theta_4) \sin(\theta_5) + a_3 \ln_5 2m_5 \sin(\theta_4) \sin(\theta_5) + a_4 \ln_5 2m_5 \sin(\theta_4) \sin(\theta_5) + a_5 \ln_5 2m_5 \sin(\theta_5) \sin(\theta_5) + a_5 \ln_5 2m_5 \cos(\theta_5) \cos(\theta_5
         lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) - a_2lc_{5,1}m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2) - lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) - a_2lc_{5,1}m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) - a_2lc_{5,1}m_5\cos(\theta_5) - a_2lc_{5,1}m_5\cos(\theta
         lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\sin(\theta_4)-lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5)+a_2lc_{5,3}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)
         a_2 \ln_{5.2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_2 \ln_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_5 \ln_{5.3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \ln_{5.3} m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
         0.5 a_5 \log_{10} a_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
         0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_
         lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+a_2lc_{5,1}m_5\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+a_3lc_{5,1}lc_{5,2}m_5\cos(\theta_4)\sin(\theta_5)
         a_2 \ln \ln a_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + a_2 \ln a_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + \ln a_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - \ln a_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
         a_2 \log_{5.2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{5.3} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2)
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(A12)

 $\begin{aligned} & M_{32} = I_{\text{yz},3} \sin \left(\theta_{3}\right) - I_{\text{xz},3} \cos \left(\theta_{3}\right) - I_{\text{xz},4} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) + I_{\text{yz},4} \cos \left(\theta_{3}\right) \sin \left(\theta_{4}\right) + I_{\text{yz},4} \cos \left(\theta_{4}\right) \sin \left(\theta_{3}\right) + \\ & I_{\text{xz},4} \sin \left(\theta_{3}\right) \sin \left(\theta_{4}\right) + I_{\text{yz},5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + I_{\text{xz},5} \cos \left(\theta_{3}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) + \\ & I_{\text{xz},5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{3}\right) - I_{\text{yz},5} \cos \left(\theta_{3}\right) \sin \left(\theta_{4}\right) \sin \left(\theta_{5}\right) - I_{\text{yz},5} \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) - I_{\text{yz},5} \cos \left(\theta_{5}\right) \sin \left(\theta_{3}\right) \sin \left(\theta_{4}\right) - \\ & I_{\text{xz},5} \sin \left(\theta_{3}\right) \sin \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + 0.5 a_{3} \log_{3} a_{3} \cos \left(\theta_{3}\right) + a_{3} \log_{4} a_{4} \cos \left(\theta_{3}\right) + a_{3} \log_{5} a_{5} \cos \left(\theta_{3}\right) + a_{3} \log_{5} a_{5} \cos \left(\theta_{3}\right) + a_{3} \log_{5} a_{5} \cos \left(\theta_{3}\right) \cos \left(\theta_{3}\right) + \log_{4} a_{5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) - \log_{4} a_{5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) + \log_{4} a_{5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \sin \left(\theta_{3}\right) \sin \left(\theta_{4}\right) - \log_{4} a_{5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \sin \left(\theta_{3}\right) \sin \left(\theta_{4}\right) - \log_{4} a_{5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) - \log_{4} a_{5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{3}\right) \sin \left(\theta_{4}\right) + \log_{4} a_{5} \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) - \log_{4} a_{5} \cos \left(\theta_{3}\right) \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + \log_{4} a_{5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) - \log_{5} a_{5} \log_{5} a_{5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) - \log_{5} a_{5} \log_{5} a_{5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) - \log_{5} a_{5} \log_{5} a_{5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) - \log_{5} a_{5} \log_{5} a_{5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) - \log_{5} a_{5} \log_{5} a_{5} \cos \left(\theta_{4}\right) \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) - \log_{5} a_{5} \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + \log_{5} a_{5} \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + \log_{5} a_{5} \cos \left(\theta_{4}\right) \sin \left(\theta_{5}\right) \sin \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + \log_{5} a_{5} \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + \log_{5} a_{5} \cos \left(\theta_{5}\right) \sin \left(\theta_{4}\right) \sin \left(\theta_{5}\right) + \log_{5} a_{5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) + \log_{5} a_{5} \cos \left(\theta_{5}\right) \sin \left(\theta_{5}\right) + \log_{5} a_{5}$

(A13)

 $\begin{array}{l} M_{33} \ = \ I_{\text{zz},3} + I_{\text{zz},4} + I_{\text{zz},5} + 0.25 \, a_3^{\, 2} \, m_3 + a_3^{\, 2} \, m_4 + a_3^{\, 2} \, m_5 + 0.25 \, a_4^{\, 2} \, m_4 + a_4^{\, 2} \, m_5 + 0.25 \, a_5^{\, 2} \, m_5 + \\ \ln \left(a_{3,1}^{\, 2} \, m_3 + \ln \left(a_{3,2}^{\, 2} \, m_3 + \ln \left(a_{4,1}^{\, 2} \, m_4 + \ln \left(a_{4,2}^{\, 2} \, m_4 + \ln \left(a_{5,1}^{\, 2} \, m_5 + \ln \left(a_{5,2}^{\, 2} \, m_5 + a_3 \ln \left(a_{3,1} \, m_3 + a_4 \ln \left(a_{4,1} \, m_4 + a_5 \ln \left(a_{5,1} \, m_5 + a_3 \ln \left(a_{4,1} \, m_4 + a_5 \ln \left(a_{5,1} \, m_5 \right) \right) \\ \ln \left(a_{3,1}^{\, 2} \, m_4 + \ln \left(a_{4,1}^{\, 2} \, m_4 + \ln \left(a_{4,1}^{\, 2} \, m_4 + \ln \left(a_{4,1}^{\, 2} \, m_4 + a_5 \ln \left(a_{4,1}^{\, 2} \, m_4 + a_5 \ln \left(a_{5,1}^{\, 2} \, m_5 \right) \right) \\ \ln \left(a_{4,1}^{\, 2} \, m_4 + \ln \left(a_{4,1}^{\, 2} \, m_4 + a_4 \ln \left(a_{4,1}^{\, 2} \, m_4 + a_5 \ln \left(a_{5,1}^{\, 2} \, m_5 \right) \right) \\ \ln \left(a_{4,1}^{\, 2} \, m_4 + \ln \left(a_{4,1}^{\, 2} \, m_4 + a_5 \ln \left(a_{4,1}^{\, 2} \, m_4 + a_4 \ln \left(a_{4,1}^{\, 2} \, m_4 + a_5 \ln \left(a_{4,1}^{\, 2} \, m_4 + a_4 \ln \left(a_{4,1}^{\, 2} \, m_4 +$

(A14)

 $M_{34} = I_{zz,4} + I_{zz,5} + 0.25 \, a_4^2 \, m_4 + a_4^2 \, m_5 + 0.25 \, a_5^2 \, m_5 + \mathrm{lc_{4,1}}^2 \, m_4 + \mathrm{lc_{4,2}}^2 \, m_4 + \mathrm{lc_{5,1}}^2 \, m_5 + \mathrm{lc_{5,2}}^2 \, m_5 + \mathrm{lc_{5,2}}^2 \, m_5 + \mathrm{lc_{4,1}}^2 \, m_4 + a_5 \, \mathrm{lc_{5,1}} \, m_5 + 0.5 \, a_3 \, a_4 \, m_4 \, \cos{(\theta_4)} + a_3 \, a_4 \, m_5 \, \cos{(\theta_4)} + a_3 \, \mathrm{lc_{4,1}} \, m_4 \, \cos{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc_{5,2}} \, m_5 \, \cos{(\theta_5)} - \mathrm{a_4} \, a_5 \, m_5 \, \sin{(\theta_5)} - a_3 \, \mathrm{lc_{5,1}} \, m_5 \, \sin{(\theta_5)} - a_3 \, \mathrm{lc_{5,2}} \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - \mathrm{a_5} \, a_5 \, m_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - \mathrm{a_5} \, \mathrm{lc_{5,2}} \, m_5 \, \sin{(\theta_4)} + \mathrm{a_5} \, \mathrm{lc_{5,2}} \, m_5 \, \sin{(\theta_4)} + \mathrm{a_5} \, \mathrm{lc_{5,2}} \, m_5 \, \sin{(\theta_4)} + \mathrm{a_5} \, \mathrm{lc_{5,2}} \, m_5 \, \sin{(\theta_5)} - \mathrm{a_5} \, \mathrm{lc_{5,2}} \, m_5 \, \sin{(\theta_5)} + \mathrm{a_5} \, \mathrm{lc_{5,2}} \, m_5 \, \mathrm{lc_{$

 $M_{35} = I_{\text{zz},5} + 0.25\,a_5^{\,2}\,m_5 + \text{lc}_{5,1}^{\,2}\,m_5 + \text{lc}_{5,2}^{\,2}\,m_5 + a_5\,\text{lc}_{5,1}\,m_5 - a_4\,\text{lc}_{5,2}\,m_5\cos\left(\theta_5\right) - 0.5\,a_4\,a_5\,m_5\sin\left(\theta_5\right) - a_4\,\text{lc}_{5,1}\,m_5\sin\left(\theta_5\right) - a_3\,\text{lc}_{5,2}\,m_5\cos\left(\theta_4\right)\cos\left(\theta_5\right) - 0.5\,a_3\,a_5\,m_5\cos\left(\theta_4\right)\sin\left(\theta_5\right) - 0.5\,a_3\,a_5\,m_5\cos\left(\theta_4\right) - a_3\,\text{lc}_{5,1}\,m_5\cos\left(\theta_4\right)\sin\left(\theta_5\right) - a_3\,\text{lc}_{5,1}\,m_5\cos\left(\theta_4\right)\sin\left(\theta_4\right) + a_3\,\text{lc}_{5,2}\,m_5\sin\left(\theta_4\right)\sin\left(\theta_5\right)$

(A16)

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M_{41} = I_{yz,4} \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - I_{zz,5} \sin(\theta_2) - 0.25 a_4^2 m_4 \sin(\theta_2) - a_4^2 m_5 \sin(\theta_2) - 0.25 a_5^2 m_5 \cos(\theta_2) 
{\rm lc_{4,1}}^2 \, m_4 \, \sin{(\theta_2)} - {\rm lc_{4,2}}^2 \, m_4 \, \sin{(\theta_2)} - {\rm lc_{5,1}}^2 \, m_5 \, \sin{(\theta_2)} - {\rm lc_{5,2}}^2 \, m_5 \, \sin{(\theta_2)} - I_{yz,4} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} - I_{yz,4} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + I_{yz,4} \, \cos{(\theta_4)} \, \cos{(\theta_
I_{xz,4} \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - I_{xz,4} \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - I_{zz,4} \sin(\theta_2) - a_4 \log_{10}(\theta_4) - a_5 \log_{10}(\theta_2) - a_5 \log_{10}(\theta_2) - a_5 \log_{10}(\theta_3) - a_5 \log_{10}(\theta_4) - a_5 \log_{10}(\theta_5) - a_5 \log_{10}(\theta_5) - a_5 \log_{10}(\theta_5) - a_5 \log_{10}(\theta_5) - 
I_{xz,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + I_{yz,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + I_{yz,5}\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4) + I_{yz,5}\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_5)
I_{\text{vz.5}}\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{\text{xz.5}}\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+I_{\text{xz.5}}\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+I_{\text{xz.5}}\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)\sin(\theta_5)
I_{xz,5} \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - I_{yz,5} \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 lc_{4,2} m_4 \cos(\theta_3) \cos(\theta_4) + a_2 lc_{4,2} m_4 \cos(\theta_3) \cos(\theta_4) + a_3 lc_{4,2} m_4 \cos(\theta_3) \cos(\theta_4) + a_4 lc_{4,2} m_4 cos(\theta_3) \cos(\theta_4) + a_4 lc_{4,2} m_4 cos(\theta_4) + a_4 lc_{4,2} m_4 cos(\theta_5) + a_4 lc_{4,2} m_4 cos(\theta_5) + a_4 lc_{4,2} m_5 cos(\theta_5) + a_4 lc_{4,2} m_5 cos(\theta_5) + a_4 lc_{4,2} m_5 cos(\theta_5) + a_5 lc
    0.5 a_1 a_4 m_4 \cos(\theta_3) \sin(\theta_4) + 0.5 a_1 a_4 m_4 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) - a_1 a_4 m_4 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \cos(\theta_4) \sin(\theta_4) + a_1 a_4 m_5 \cos(\theta_4) \cos
    0.5 a_3 a_4 m_4 \cos(\theta_4) \sin(\theta_2) - a_3 a_4 m_5 \cos(\theta_4) \sin(\theta_2) + a_1 \ln_{4.1} m_4 \cos(\theta_3) \sin(\theta_4) + a_1 \ln_{4.1} m_4 \cos(\theta_4) \sin(\theta_3) - a_1 \ln_{4.1} m_4 \cos(\theta_4) \sin(\theta_3) - a_2 \ln_{4.1} m_4 \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.1} m_4 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.1} m_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.1} m_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.1} m_4 \cos(\theta_4) \cos
    a_3 \ln a_4 + a_4 \cos(\theta_4) \sin(\theta_2) + 2.0 a_4 \ln a_5 + a_5 \cos(\theta_5) \sin(\theta_2) + a_4 \ln a_5 + a_5 \sin(\theta_2) \sin(\theta_5) - a_1 \ln a_4 \sin(\theta_3) \sin(\theta_4) + a_5 \ln a_5 \sin(\theta_2) \sin(\theta_5) - a_5 \ln a_5 \sin(\theta_5) + a_5 \ln a_5 \sin(\theta_5) \sin(\theta_5) + a_5 \ln a_5 \ln a_5 \sin(\theta_5) + a_5 \ln a_5 \ln a_5 \sin(\theta_5) + a_5 \ln a_5 \ln
    a_3 \log_{4.2} m_4 \sin(\theta_2) \sin(\theta_4) + 2.0 a_4 \log_{5.1} m_5 \sin(\theta_2) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_1 \log_{5.1} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_2 \log_{5.1} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_3 \log_{5.1} m_5 \cos(\theta_5) + a_4 \log_{5.1} m_5 \cos(\theta_5) + a_5 \log_{5.
    lc_{4,2}lc_{4,3}m_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4) - a_2lc_{4,2}m_4\cos(\theta_3)\cos(\theta_4)\sin(\theta_2) + 0.5a_4lc_{4,3}m_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_3)\cos(\theta_3)\sin(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_3)\cos(\theta_3)\sin(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_3)\cos(\theta_3)\sin(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_3)\sin(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_3)\cos(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_4)\cos(\theta_4)\cos(\theta_4) + 0.5a_4lc_{4,3}m_4\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)
    0.5 a_4 lc_{4.3} m_4 cos(\theta_2) cos(\theta_4) sin(\theta_3) - a_1 lc_{5.2} m_5 cos(\theta_3) cos(\theta_4) sin(\theta_5) - a_1 lc_{5.2} m_5 cos(\theta_3) cos(\theta_5) sin(\theta_4) - a_1 lc_{5.2} lc_{5.2}
    a_1 \log_{12} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_3 \log_{12} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_4 \log_{13} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{12} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
    a_4 \log_{10} a_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \cos(\theta_4) \cos(\theta_5) \cos(\theta_
    a_2 a_4 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - a_2 a_4 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 0.5 a_1 a_5 m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_5 a_5 \cos(\theta_5) \sin(\theta_5) - a_5 a_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
    0.5 a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_3 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_5) \cos(\theta
    0.5 a_3 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + \ln_{4.1} \ln_{4.3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + \ln_{4.1} \ln_{4.3} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - \ln_{4.3} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - \ln_{4.3} m_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + \ln_{4.3} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + \ln_{4.3} m_4 \cos(\theta_4) \sin(\theta_4) + \ln_{4.3} m_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + \ln_{4.3} m_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) + \ln_{4.3} m_4 \cos(\theta_4) \cos(\theta
    a_2 \ln_{1} m_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - a_2 \ln_{1} m_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - a_1 \ln_{5,1} m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_1 \ln_{5,1} m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \ln_{5,1} m_5 \cos(\theta_4) \sin(\theta_5) - a_3 \ln_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) - a_4 \ln_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) - a_5 \ln_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) - a_5 \ln_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
    a_1 \log_{10} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_3 \log_{10} m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_3 \log_{10} m_5 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + a_4 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin
    a_3 \log_{10} m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - \log_{10} \log_{10} m_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{10} m_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin
    a_1 \log_{12} m_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + \log_{11} \log_{12} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - \log_{11} \log_{12} m_5 \sin(\theta_5) + \log_{11} \log_{12} m_5 \sin(\theta_5) + \log_{11} \log_{12} m_5 \cos(\theta_5) + \log_{
    a_2 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - \log_{10} \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - \log_{10} \log_{10} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - \log_{10} \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) - \log_{10} m_5 \cos(\theta_5) \cos(
    lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_4)\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos
    a_2 \log_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_5 \log_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{5,3} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{5,3} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
    0.5 a_5 lc_5 a_5 m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 lc_5 a_5 m_5 \cos(\theta_4) \sin(\theta_5) \sin(\theta_
    0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - \ln \ln \ln \ln \ln \ln \ln \theta_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - \ln \ln \ln \ln \ln \theta_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - \ln \ln \ln \ln \ln \ln \theta_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
    lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) + a_2lc_{5,1}m_5\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5) + a_2lc_{5,1}m_5\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5) + a_3lc_{5,1}m_5\cos(\theta_4)\sin(\theta_5)
    a_2 \log_{5.1} m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + \log_{5.2} \log_{5.3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{5.2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{5.2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{5.2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{5.2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{5.2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{5.2} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{5.2} m_5 \cos(\theta_5) 
    0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (A17)
```

 $M_{42} = I_{yz,4} \cos(\theta_3) \sin(\theta_4) - I_{xz,4} \cos(\theta_3) \cos(\theta_4) + I_{yz,4} \cos(\theta_4) \sin(\theta_3) + I_{xz,4} \sin(\theta_3) \sin(\theta_4) + I_{yz,5} \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{xz,5} \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + I_{xz,5} \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + I_{xz,5} \cos(\theta_4) \sin(\theta_3) - I_{yz,5} \cos(\theta_3) \sin(\theta_4) + I_{xz,5} \cos(\theta_4) \sin(\theta_5) - I_{yz,5} \cos(\theta_4) \sin(\theta_5) - I_{yz,5} \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - I_{xz,5} \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_4 \log_4 \cos(\theta_3) \cos(\theta_4) + a_4 \log_5 a_5 \cos(\theta_3) \cos(\theta_4) + l_{xx,5} \sin(\theta_3) \sin(\theta_4) - l_{xx,5} \sin(\theta_3) \sin(\theta_4) - l_{xx,5} \log(\theta_4) \cos(\theta_5) + 0.5 a_4 \log_4 a_5 \cos(\theta_4) \sin(\theta_3) - 0.5 a_4 \log_4 a_5 \sin(\theta_4) \sin(\theta_5) - a_4 \log_4 a_5 \sin(\theta_4) \sin(\theta_5) - a_4 \log_4 a_5 \sin(\theta_4) \sin(\theta_5) \sin(\theta_4) - l_{xx,5} \sin(\theta_3) \sin(\theta_4) - l_{xx,5} \log(\theta_4) \cos(\theta_5) \sin(\theta_4) - l_{xx,5} \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - l_{xx,5} \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + l_{xx,5} \cos(\theta_4) \sin(\theta_5) + l_{xx,5} \cos(\theta_4) \sin(\theta_5) + l_{xx,5} \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + l_{xx,5} \cos(\theta_5) \sin(\theta_5) + l_{xx,5} \cos(\theta_5) \sin(\theta_5)$

 $M_{43} = I_{zz,4} + I_{zz,5} + 0.25 \, a_4^2 \, m_4 + a_4^2 \, m_5 + 0.25 \, a_5^2 \, m_5 + \ln_{4,1}^2 \, m_4 + \ln_{4,2}^2 \, m_4 + \ln_{5,1}^2 \, m_5 + \ln_{5,2}^2 \, m$

 $M_{44} = I_{zz,4} + I_{zz,5} + 0.25 a_4^2 m_4 + a_4^2 m_5 + 0.25 a_5^2 m_5 + lc_{4,1}^2 m_4 + lc_{4,2}^2 m_4 + lc_{5,1}^2 m_5 + lc_{5,2}^2 m_5 + a_4 lc_{4,1} m_4 + a_5 lc_{5,1} m_5 - 2.0 a_4 lc_{5,2} m_5 \cos(\theta_5) - a_4 a_5 m_5 \sin(\theta_5) - 2.0 a_4 lc_{5,1} m_5 \sin(\theta_5)$ (A20)

 $M_{45} = 0.25 m_5 a_5^2 + m_5 a_5 lc_{5,1} - 0.5 a_4 m_5 \sin(\theta_5) a_5 + m_5 lc_{5,1}^2 - a_4 m_5 \sin(\theta_5) lc_{5,1} + m_5 lc_{5,2}^2 - a_4 m_5 \cos(\theta_5) lc_{5,2} + I_{zz,5}$ (A21)

```
M_{51} = I_{\text{vz},5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_5^2 m_5 \sin(\theta_2) - \log_{5,1}^2 m_5 \sin(\theta_2) - \log_{5,2}^2 m_5 \sin(\theta_2) - \log_{5,2}^2 m_5 \sin(\theta_2)
a_5 \log_{10} m_5 \sin(\theta_2) - I_{xz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - I_{zz,5} \sin(\theta_2) + I_{vz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + I_{vz,5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + I_{vz,5} \cos(\theta_5) 
I_{\text{vz.5}}\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{\text{xz.5}}\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+I_{\text{xz.5}}\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+I_{\text{xz.5}}\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)\sin(\theta_5)
I_{\text{xz.5}}\cos\left(\theta_{2}\right)\cos\left(\theta_{5}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{4}\right)-I_{\text{yz.5}}\cos\left(\theta_{2}\right)\sin\left(\theta_{3}\right)\sin\left(\theta_{4}\right)\sin\left(\theta_{5}\right)+a_{4}\log_{2}m_{5}\cos\left(\theta_{5}\right)\sin\left(\theta_{2}\right)+0.5
a_4 \log_{10} m_5 \sin(\theta_2) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{10} m_5 \cos(\theta_5) + a_1 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) + a_1 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5
a_1 \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_3 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_1 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_1 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_2 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_2 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_2 \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 a_1 a_5 m_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_1 a_5 m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \cos(\theta_5) \cos(\theta_5)
0.5 \, a_3 \, a_5 \, m_5 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \cos(\theta_5) \, \sin(\theta_2) \, \sin(\theta_4) - a_1 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}
a_1 \log_{10} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_1 \log_{10} m_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_3 \log_{10} m_5 \cos(\theta_4) \sin(\theta_5) + a_1 \log_{10} m_5 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{10} m_5 \cos(\theta_4) \sin(\theta_5) + a_3 \log_{10} m_5 \cos(\theta_4) \sin(\theta_5) + a_4 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \cos(\theta_5) \cos(\theta_
a_3 \log_{10} m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_1 \log_{10} m_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{10} m_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
a_2 \log_{10} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - \log_{10} \log_{10} m_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - \log_{10} \log_{10} m_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - \log_{10} \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) - \log_{10} m_5 \cos(\theta_5) \cos(
lc_{5,2}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\sin(\theta_5) + a_2lc_{5,2}m_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5
a_2 \ln_{5,2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_5 \ln_{5,3} m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \cos(\theta_5) \cos(
0.5 a_5 \log_3 m_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \cos(\theta_4) \sin(\theta_5) \sin(\theta
0.5 a_2 a_5 m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - \ln \ln \ln \theta_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - \ln \ln \theta_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - \ln \ln \theta_5 \cos(\theta_5) \sin(\theta_5) \sin
lc_{5,1}lc_{5,3}m_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) + a_2lc_{5,1}m_5\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5) + a_2lc_{5,1}m_5\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5) + a_2lc_{5,1}m_5\cos(\theta_4)\sin(\theta_5)
a_2 \log_{5.1} m_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + \log_{5.2} \log_{5.3} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{5.2} m_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{5.2} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{5.2} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{5.2} m_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_5) + a_3 \log_{5.2} m_5 \cos(\theta_5) 
0.5 a_5 \log_{3} a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 a_5 a_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (A22)
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 $M_{52} = I_{yz,5} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} + I_{xz,5} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_5)} + I_{xz,5} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_4)} + I_{xz,5} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} - I_{yz,5} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - I_{yz,5} \cos{(\theta_4)} \sin{(\theta_5)} - I_{yz,5} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} - I_{xz,5} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - I_{z,5} \cos{(\theta_5)} \cos{(\theta$

 $M_{53} = I_{zz,5} + 0.25 \, a_5^2 \, m_5 + \ln_{5,1}^2 \, m_5 + \ln_{5,2}^2 \, m_5 + a_5 \ln_{5,1} \, m_5 - a_4 \ln_{5,2} \, m_5 \cos(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \sin(\theta_5) - a_4 \ln_{5,1} \, m_5 \sin(\theta_5) - a_3 \ln_{5,2} \, m_5 \cos(\theta_4) \cos(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \cos(\theta_4) \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \cos(\theta_5) \sin(\theta_4) - a_3 \ln_{5,1} \, m_5 \cos(\theta_4) \sin(\theta_5) - a_3 \ln_{5,1} \, m_5 \cos(\theta_5) \sin(\theta_4) + a_3 \ln_{5,2} \, m_5 \sin(\theta_4) \sin(\theta_5)$ (A24)

 $M_{54} = 0.25 m_5 a_5^2 + m_5 a_5 lc_{5,1} - 0.5 a_4 m_5 \sin(\theta_5) a_5 + m_5 lc_{5,1}^2 - a_4 m_5 \sin(\theta_5) lc_{5,1} + m_5 lc_{5,2}^2 - a_4 m_5 \cos(\theta_5) lc_{5,2} + I_{zz,5}$ (A25)

$$M_{55} = 0.25 \, m_5 \, a_5^2 + m_5 \, a_5 \, {\rm lc}_{5,1} + m_5 \, {\rm lc}_{5,2}^2 + m_5 \, {\rm lc}_{5,2}^2 + I_{zz,5}$$
(A26)

In the context of the coupled human-exoskeleton system, m_i represents the mass, a_i denotes the length, and $I_{xx,i}, I_{yy,i}, I_{zz,i}$ are the moments of inertia for the i^{th} link. Additionally, $I_{xy,i}, I_{xz,i}, I_{yz,i}$ refer to the products of inertia. The coordinates $l_{ci,x}, l_{ci,y}, l_{ci,z}$ specify the center of mass along the x, y, and z axes, respectively, while θ_i signifies the angular position.

B. CORIOLIS AND CENTRIPETAL MATRIX $(C(q, \dot{q}))$

Regarding the Coriolis and centripetal matrix, the following formulations are derived:

$$C(q,\dot{q}) = \begin{bmatrix} C_{11} & C_{12} & C_{13} & C_{14} & C_{15} \\ C_{21} & C_{22} & C_{23} & C_{24} & C_{25} \\ C_{31} & C_{32} & C_{33} & C_{34} & C_{35} \\ C_{41} & C_{42} & C_{43} & C_{44} & C_{45} \\ C_{51} & C_{52} & C_{53} & C_{54} & C_{55} \end{bmatrix}$$
(A27)

where

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C_{11} = 0.25 I_{xy,3} \dot{\theta}_2 + 0.25 I_{xy,3} \dot{\theta}_3 - 0.25 I_{xy,4} \dot{\theta}_2 + 0.25 I_{xy,4} \dot{\theta}_3 - 0.25 I_{xy,5} \dot{\theta}_2 + 0.25 I_{xy,4} \dot{\theta}_4 + 0.25 I_{xy,5} \dot{\theta}_3 + 0.25 I_{xy,5} \dot{\theta}_4 + 0.25 I_{xy,5} \dot{\theta}_5 + 0.25 I_{xy,
   0.25 I_{xy,5} \dot{\theta}_4 + 0.25 I_{xy,5} \dot{\theta}_5 - 0.5 I_{xy,3} \dot{\theta}_2 \cos(\theta_2)^2 - 0.5 I_{xy,3} \dot{\theta}_2 \cos(\theta_3)^2 - 0.5 I_{xy,3} \dot{\theta}_3 \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_2 \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot
   0.5 I_{xy,3} \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 I_{xy,4} \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 I_{xy,4} \dot{\theta}_3 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_2 \cos(\theta_4)^2 -
   0.5 I_{xy,4} \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 - 0.5 I_{xy,4} \dot{\theta}_3 \cos(\theta_4)^2 - 0.5 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 - 0.5 I_{xy,6} \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 I_{xy,6} \dot{\theta}_3 \cos(\theta_3)^2 
   0.5 I_{xv,4} \dot{\theta}_4 \cos(\theta_3)^2 + 0.5 I_{xv,5} \dot{\theta}_2 \cos(\theta_4)^2 - 0.5 I_{xv,5} \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 I_{xv,5} \dot{\theta}_4 \cos(\theta_2)^2 - 0.5 I_{xv,4} \dot{\theta}_4 \cos(\theta_4)^2 + 0.5 I_{xv,5} \dot{\theta}_5 \cos(\theta_5)^2 
0.5 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - 0.5 I_{xv.5} \dot{\theta}_3 \cos(\theta_4)^2 - 0.5 I_{xv.5} \dot{\theta}_4 \cos(\theta_3)^2 + 0.5 I_{xv.5} \dot{\theta}_5 \cos(\theta_2)^2 - 0.5 I_{xv.5} \dot{\theta}_3 \cos(\theta_5)^2 - 0.5 I_{xv.5} \dot{\theta}_5 \cos(\theta_5)^2 + 0.5 I_{xv.5} \dot{\theta}_5 \cos(\theta_5)^2 
   0.5 I_{xy.5} \dot{\theta}_4 \cos(\theta_4)^2 - 0.5 I_{xy.5} \dot{\theta}_5 \cos(\theta_3)^2 - 0.5 I_{xy.5} \dot{\theta}_4 \cos(\theta_5)^2 - 0.5 I_{xy.5} \dot{\theta}_5 \cos(\theta_4)^2 - 0.5 I_{xy.5} \dot{\theta}_5 \cos(\theta_5)^2 +
   I_{xz} = \dot{\theta}_2 \cos(2.0\,\theta_2) + 0.25\,I_{xy} = \dot{\theta}_2 \cos(2.0\,\theta_3) + 0.25\,I_{xy} = \dot{\theta}_3 \cos(2.0\,\theta_3) - 0.5\,I_{xx} = \dot{\theta}_2 \sin(2.0\,\theta_2) - 0.25\,I_{xx} = \dot{\theta}_2 \sin(2.0\,\theta_2) + 0.25\,I_{xx
   0.125 I_{xx,3} \dot{\theta}_2 \sin(2.0 \theta_3) - 0.25 I_{xx,4} \dot{\theta}_2 \sin(2.0 \theta_2) + 0.125 I_{xx,3} \dot{\theta}_3 \sin(2.0 \theta_3) - 0.25 I_{xx,5} \dot{\theta}_2 \sin(2.0 \theta_2) - 0.25 I_{yy,3} \dot{\theta}_2 \sin(2.0 \theta_2) - 0.25 I_{yy,3} \dot{\theta}_2 \sin(2.0 \theta_2) - 0.25 I_{yy,3} \dot{\theta}_3 \sin(2.0 \theta_2) - 0.
   0.125 I_{vv,3} \dot{\theta}_2 \sin{(2.0\,\theta_3)} - 0.25 I_{vv,4} \dot{\theta}_2 \sin{(2.0\,\theta_2)} - 0.125 I_{vv,3} \dot{\theta}_3 \sin{(2.0\,\theta_3)} - 0.25 I_{vv,5} \dot{\theta}_2 \sin{(2.0\,\theta_2)} + 0.5 I_{zz,2} \dot{\theta}_2 \sin{(2.0\,\theta_2)} + 0.5 I_{z
   0.5 I_{zz,3} \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 I_{zz,4} \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 I_{zz,5} \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 I_{xy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.25 I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.25 I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.
   0.25 I_{xy,4} \dot{\theta}_4 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} + 0.5 I_{yz,3} \dot{\theta}_2 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} - 0.25 I_{yz,3} \dot{\theta}_3 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} - 0.125 a_3 lc_{3,2} m_3 \dot{\theta}_2 - 0.125 a_3 lc_{3,2} m_3 \dot{\theta}_3 - 0.125 a_3 lc_{3,2}
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   0.125\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_4 - 0.125\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_5 - 0.25\,\mathrm{lc}_{3,1}\,\mathrm{lc}_{3,2}\,m_3\,\dot{\theta}_2 - 0.25\,\mathrm{lc}_{3,1}\,\mathrm{lc}_{3,2}\,m_3\,\dot{\theta}_3 + 0.25\,\mathrm{lc}_{4,1}\,\mathrm{lc}_{4,2}\,m_4\,\dot{\theta}_2 - 0.25\,\mathrm{lc}_{4,1}\,\mathrm{lc}_{4,2}\,m_4\,\dot{\theta}_3 - 
   0.25 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_4 + 0.25 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_2 - 0.25 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_3 - 0.25 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_4 - 0.25 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_5 +
   0.5 I_{xz,3} \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) - 0.5 I_{xz,3} \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) - 0.25 I_{xz,3} \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.25 I_{xz,3} \dot{\theta}_3 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 I_{xz,3} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xz,3} \dot{\theta}_3 \cos(\theta_3) + 0.25 I_{xz,3} \dot{\theta}_3 \cos(\theta_3) + 0.25 I_{xz,3} \dot{\theta}_3 \cos(\theta_3) + 0.25 I_{xz,3} \dot{
   0.125 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.125 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_4) 
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0.125 I_{\text{vv},4} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.125 I_{\text{vv},4} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} + 0.125 I_{\text{vv},4} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},4} \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},4} \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},4} \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},4} \dot{\theta}_4 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},4} \dot{\theta}_4 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},4} \dot{\theta}_4 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},4} \dot{\theta}_4 \cos{(2.0\,\theta_4)} \cos{(
   0.125 I_{vv,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 I_{vv,4} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 I_{vv,4} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.125 I_{vv,4} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 I_{vv,4} \dot{\theta}_4 \cos(2.0 \theta_3) \theta_3)
   0.25 I_{xy,4} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 I_{xy,4} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 I_{xy,4} \dot{\theta}_4 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.5 I_{yz,3} \dot{\theta}_2 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} - 0.25 I_{xy,4} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 I_{xy,4} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 I_{xy,4} \dot{\theta}_4 \sin{(
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0.25 I_{vz,3} \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_3) + 0.5 I_{vz,3} \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) + 0.25 I_{vz,3} \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 I_{xz,3} \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 I_{xz,3} \dot{\theta}_3 \cos(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0 \theta_3) + 0.5 I_{xz,3} \dot{\theta}_3 \cos(2.0 \theta_3) +
    0.5 I_{xz,3} \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) + 0.25 I_{xz,3} \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.25 I_{xz,3} \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2^2 m_2 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.125 a_3^2 \sin(2.0 \theta_2) \sin(\theta_3) + 0.125 a_3^2 \sin(2.0 \theta_2) \cos(\theta_3) + 0.125 a_3^2 \sin(2.0 \theta_2) \cos(\theta_3) + 0.125 a_3^2 \sin(2.0 \theta_2) \cos(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_3^2 \cos(2.0 \theta_2) \cos(2.0 \theta_2) \sin(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0 \theta_2) \sin(2.0 \theta_2) \cos(2.0 \theta_2) \sin(2.0 \theta_2) \cos(2.0 \theta_2) \sin(2.0 \theta_2) \cos(2.0 \theta_2) 
    0.25 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.03125 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} - 0.125 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} + 0.00125 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.00125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, d_3 \, d
    0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.125 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} - 0.125 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.125 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5
    0.125 a_3^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + I_{xy,3} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 + I_{xy,3} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xy,3} \dot{\theta}_3 \sin(2.0 \theta_3) + I_{xy,3} \dot{\theta}_3 \cos(\theta_3)^2 + I_{xy,3
    I_{xv,4} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xv,4} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4)^2 - I_{xv,4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xv,5} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xv,4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 - I_{xv,4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xv,5} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xv,6} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xv,6} \dot{\theta}_3 \cos(\theta_3)^2 - I
    I_{xy,4} \,\dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_4)^2} - I_{xy,4} \,\dot{\theta}_4 \cos{(\theta_2)^2} \cos{(\theta_3)^2} - I_{xy,5} \,\dot{\theta}_2 \cos{(\theta_2)^2} \cos{(\theta_4)^2} - I_{xy,5} \,\dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_3)^2} + I_{xy,4} \,\dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - I_{xy,5} \,\dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_3)^2} + I_{xy,4} \,\dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - I_{xy,5} \,\dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_3)^2} + I_{xy,4} \,\dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_3)^2} + I_{xy,4} \,\dot{\theta}_3 \cos{(\theta_3)^
    I_{xy,4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4)^2 - I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 - I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4)^2 - I_{xy,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 + I_{xy,5} \dot{\theta}_5 \cos(\theta_2)^2 + I_{xy,5} \dot{\theta}_5 \cos(\theta_3)^2 + I_{xy,5} \dot
    I_{xy,4} \dot{\theta}_4 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - I_{xy,5} \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_5)^2} - I_{xy,5} \dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_5)^2} + I_{xy,5} \dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - I_{xy,5} \dot{\theta}_4 \cos{(\theta_2)^2} \cos{(\theta
    I_{xv,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xv,5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + I_{xv,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5)^2 - I_{xv,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_5)^2 + I_{xv,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 - I_{xv,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + I_{xv,5} \dot{\theta}_4 \cos(\theta_5)^2 + I_{xv,5} \dot{\theta}_5 \cos(\theta_5)^2 + I_{xv,5} \dot
    I_{xy.5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4)^2 + I_{xy.5} \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5)^2 + I_{xy.5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5)^2 - I_{xy.5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_5)^2 + I_{xy.5} \dot{\theta}_5 \cos(\theta_4)^2 + I_{xy.5} \dot{\theta}_5 \cos(\theta_5)^2 + I_{xy.5} \dot
I_{xy,5} \dot{\theta}_4 \cos{(\theta_4)^2} \cos{(\theta_5)^2} + I_{xy,5} \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_5)^2} + I_{xy,5} \dot{\theta}_5 \cos{(\theta_4)^2} \cos{(\theta_5)^2} - 0.5 I_{yz,3} \dot{\theta}_2 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} - 0.5 I_{yz,3} \dot{\theta}_2 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} + 0.5 I_{yz,3} \dot{\theta}_3 \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_2)
    0.25 I_{yz,3} \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_3) + 0.5 \lg_2 \frac{1}{2} m_2 \dot{\theta}_2 \sin(2.0 \theta_2) - 0.5 \lg_3 \frac{2}{2} m_2 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 \lg_3 \frac{1}{2} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) - 0.5 \lg_3 \frac{2}{2} m_2 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 \lg_3 \frac{2}{2} m_3 \dot{\theta}_3 \sin(2.0 \theta_2) + 0.25 \lg_3 \frac{2}{2} m_3 \dot{\theta}_3 \sin(2.0 \theta_2) + 0.25 \lg_3 \frac{2}{2} m_3 \dot{\theta}_3 \sin(2.0 \theta_2)
0.125 \log_{3,1}{}^2 m_3 \dot{\theta}_2 \sin{(2.0 \,\theta_3)} + 0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_2 \sin{(2.0 \,\theta_2)} - 0.125 \log_{3,1}{}^2 m_3 \dot{\theta}_3 \sin{(2.0 \,\theta_3)} + 0.125 \log_{3,2}{}^2 m_3 \dot{\theta}_2 \sin{(2.0 \,\theta_3)} + 0.125 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \sin{(2.0 \,\theta_3)} + 0.125 \log_{3,2}{}^2 m_
    0.5 \lg_{3.3}{}^2 m_3 \dot{\theta}_2 \sin{(2.0 \,\theta_2)} + 0.125 \lg_{3.2}{}^2 m_3 \dot{\theta}_3 \sin{(2.0 \,\theta_3)} + 0.25 \lg_{4.1}{}^2 m_4 \dot{\theta}_2 \sin{(2.0 \,\theta_2)} + 0.25 \lg_{4.2}{}^2 m_4
    0.5 \lg_{4.3} 2 + m_4 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 \lg_{5.1} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 \lg_{5.2} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.5 \lg_{5.3} 2 + m_5 \dot{\theta}_2 + m_5
    0.5 I_{xy,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2)^2 + 0.5 I_{xy,3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,3} \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{xx,3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos
0.25 I_{\text{vv},3} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \cos{(\theta_2)^2} - 0.25 I_{\text{vv},3} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \cos{(\theta_2)^2} - 0.25 I_{\text{xx},3} \dot{\theta}_2 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{xx},3} \dot{\theta}_3 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{xx},3} \dot{\theta}_3 \cos{(\theta_2)} + 
    0.25 I_{xx,4} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,3} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,4} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}
0.25 I_{xx,3} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,4} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,4} \dot{\theta}_4 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,6} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_6 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_7 \dot{\theta}_7 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_7 \dot{\theta}_7 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_7 \cos(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_7 \cos(\theta_3) + 0.25 I_{x
    0.25 I_{xx,4} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,4} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) + 0.25 I_{xx,6} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_6) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_6) \sin(\theta_6) + 0.25 I_{xx,6} \dot{\theta}_6 \cos(\theta_6) \sin(\theta_6) + 0.25 I_{xx,6} \dot{\theta}_6 \cos(\theta_6) \sin(\theta_6) + 0.25 I_{xx,6} \dot{\theta}_6 \cos(\theta_6) + 0.25 I_{xx,6} \dot
    0.25 I_{xx,4} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) - 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{xx,6} \dot{\theta}_5 \cos(\theta_5) +
    0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{xx,4} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(
    0.25 I_{xx} = 5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx} = 5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{xx} = 5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx} = 5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx} = 6 \dot{\theta}_5 \sin(\theta_5) - 0.25 I_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) - 0.25 I_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) - 0.25 I_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) - 0.25 I_{xx} = 6 
    0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,3} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,3} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{yy,4} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,4} \dot{\theta}_5 \cos(\theta_5) + 0.25 I_{yy,4} 
    0.25 I_{\text{vv},3} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{\text{vv},3} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4}
    0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{\text{vv},3} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) - 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{\text{vv},4} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3)
    0.25 I_{yy} = 5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy} = 4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{yy} = 5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{yy} = 5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) - 0.25 I_{yy} = 5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{yy} = 5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.25 I_{yy} = 5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_
    0.25 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.25
    0.25 I_{vv,4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{vv,5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{vv,5} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{vv,4} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{vv,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{vv,6} \dot{\theta}_5 \cos(\theta_5) + 0.25 I_{vv,6} \dot
    0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos
    0.25 I_{yy.5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy.5} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{yy.5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy.5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{yy.5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy.5} \dot{\theta}_5 \cos(\theta_5) + 0.25 I_
    0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4,1}{}^2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0
    0.125 \log_{4} \frac{1}{2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.125 \log_{4} \frac{2}{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.125 \log_{4} \frac{2}{2} \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) + 0.125 \log_{4} \frac{2}{2} \cos(2.0 \theta_4) \cos(2.0 \theta_4)
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 $0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_4 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_4 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} - 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_4 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_4 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_4 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_4 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,2}{}^2 m_4 \dot{\theta}_4 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)}$ $0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) - 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{4}) - 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{5} \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}{}^{2} m_{5} \dot{\theta}_{5} \sin (2.0 \theta_{3}) + 0.125 \operatorname{lc}_{4,2}$ $0.5 I_{xx,3} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,3} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,3} \dot{\theta}_3 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{xx,3} \dot{\theta}_3 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{xx,3} \dot{\theta}_3 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^$ $0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{xx,3} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,4} \dot{\theta}_3 \cos(\theta_3) + 0.5 I_{$ $0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_$ $0.5 I_{xx,4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3)$ $0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_3$ $0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4$ $0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_$ $0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_3)$ $0.5 I_{xx,4} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx,6} \dot{\theta}_3 \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,6} \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,6} \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4) - 0.5 I_{xx,6} \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_4)^2$ $0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)$ $0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3)^2$ $0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 I_{xx,6} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,6} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,6} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_$ $0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)$ $0.5 I_{xx.5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta$ $0.5 I_{xx,4} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)$ $0.5 I_{xx} = 5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx} = 5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) + 0.5 I_{xx} = 6 \dot{\theta}_4 \cos(\theta_4) + 0.5 I_{xx} = 6 \dot$ $0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) - 0.5 I_{xx,5}$ $0.5 I_{xx.5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5$ $0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx.5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_5 \cos(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_5$ $0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos($ $0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin$ $0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos$ $0.5 I_{xx,5} \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) + 0.5 I_{xx,5}$ $0.5 I_{xx,5} \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{yy,3} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{yy,3} \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_3) - 0.5 I_{yy,3} \dot{\theta}_3 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos($ $0.5 I_{\text{vv},3} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{\text{vv},3} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_3$ $0.5 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta$ $0.5 I_{\text{VV}} = 5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{VV}} = 4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{\text{VV}} = 4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{VV}} = 4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{\text{VV}} = 4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{VV}} = 4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3$ $0.5 I_{vv,4} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{vv,5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{vv,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{vv,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{vv,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{vv,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) + 0.5 I_{vv,5} \dot{\theta}_3 \cos(\theta_3) + 0.5 I_{vv,5} \dot{\theta}_3 \cos(\theta_3) + 0.5$ $0.5 I_{\text{vv.}5} \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)^2} \sin{(\theta_2)} + 0.5 I_{\text{vv.}4} \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 0.5 I_{\text{vv.}4} \dot{\theta}_2 \cos{(\theta_2)^2} \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 I_{\text{vv.}4} \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 I_{\text{vv.}4} \dot{\theta}_2 \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 I_{\text{vv.}4} \dot{\theta}_2 \cos{(\theta_4)^2} \cos{(\theta_4)^2$ $0.5 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_5 \cos(\theta$ $0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_2) \cos(\theta_3) \cos(\theta_2) \cos(\theta_3) \cos(\theta_$ $0.5 I_{yy,4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 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    0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) 
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    0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5
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    0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) + 0.5 I_{\text{v
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    0.5 I_{vv.5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{vv.5} \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{vv.5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{vv.5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{vv.5} \dot{\theta}_5 \cos(\theta_5) - 
    0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{xv},4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 +
    0.5 I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + I_{yz,4} \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2
    0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_2 \cos{(\theta_2)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_2)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 - 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_3 \, \log_{3.2} m_3 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, \alpha_3 \, \log_{3.2} m_3 \, d_3 \cos{(\theta_3)}^2 + 0.25 \, \alpha_3 \, \log_{3.2} m_3 \, d_3 \cos{(\theta_3)}^2 + 0.25 \, \alpha_3 \, \log_{3.2} m_3 \, d_3 \cos{(\theta_3)}^2 + 0.25 \, \alpha_3 \, \log_{3.2} m_3 \, d_3 \cos
    0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4
    0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4
    0.25\,a_4\,\mathrm{lc}_{4,2}\,m_4\,\dot{\theta}_4\cos{(\theta_4)}^2 - 0.25\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\cos{(\theta_2)}^2 - 0.25\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\cos{(\theta_3)}^2 - 0.25\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\cos{(\theta_2)}^2 - 0.25\,a_5\,\mathrm{lc}_{5,2}
    0.25 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 + 0.25 a_5 \log_2 m_5 \cos(\theta_3)^2 + 0.25 a_5 \log_2 m_5 \cos(\theta_3)^2 + 0.25 a_5 \log_2 m_5 \cos(\theta_3)^2 + 0.25 \log_2 m_5 \cos(\theta_3)^2 + 0.25 \log_2 m_
    0.25 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_3)^2 - 0.25 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.25 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.
    0.25 a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4)^2 + 0.25 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.25 \log_{12} m_5 \cos(\theta_5)^2 + 0.25 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.25 \log_{12} m_5 \cos(\theta_5)^2 + 0.25 \log_{12} m_5 \cos(\theta_5)^2 + 0.25 \log_{12} m_5 \cos(\theta_5)^2 + 0.
    0.25 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_2 \cos(\theta_2)^2 + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_2)^2 + 0.5 \log_{11} \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_2)^2 + 0.5 \log_{11} \log_{1
    0.5 \log_{11} \log_{12} m_3 \,\dot{\theta}_3 \cos{(\theta_3)}^2 - 0.5 \log_{11} \log_{12} m_4 \,\dot{\theta}_2 \cos{(\theta_2)}^2 - 0.5 \log_{11} \log_{12} m_4 \,\dot{\theta}_2 \cos{(\theta_3)}^2 - 0.5 \log_{11} \log_{12} m_4 \,\dot{\theta}_3 \cos{(\theta_2)}^2 - 0.5 \log_{11} \log_{12} m_4 \,\dot{\theta}_3 \cos{(\theta_3)}^2 - 0.5 \log_{11} \log_{12} m_4 \,\dot{\theta}_3 \cos{(\theta_2)}^2 - 0.5 \log_{11} \log_{12} m_4 \,\dot{\theta}_3 \cos{(\theta_3)}^2 - 0.5 \log_{11} \log_{11} m_4 \,\dot{\theta}_3 \cos{(\theta_3)}^2 - 0.5 \log_{11} m_4 \,\dot{
    0.5 \operatorname{lc}_{4.1} \operatorname{lc}_{4.2} m_4 \dot{\theta}_2 \cos(\theta_4)^2 + 0.5 \operatorname{lc}_{4.1} \operatorname{lc}_{4.2} m_4 \dot{\theta}_3 \cos(\theta_3)^2 - 0.5 \operatorname{lc}_{4.1} \operatorname{lc}_{4.2} m_4 \dot{\theta}_4 \cos(\theta_2)^2 + 0.5 \operatorname{lc}_{4.1} \operatorname{lc}_{4.2} m_4 \dot{\theta}_3 \cos(\theta_4)^2 + 0.5 \operatorname{lc}_{4.1} \operatorname{lc}_{4.2} m_4 \dot{\theta}_4 \cos(\theta_4
    0.5 \lg_{4,1} \lg_{4,2} m_4 \dot{\theta}_4 \cos{(\theta_3)}^2 + 0.5 \lg_{4,1} \lg_{4,2} m_4 \dot{\theta}_4 \cos{(\theta_4)}^2 - 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_2)}^2 - 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 - 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_3 \sin{(\theta_3)}^2 + 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_3 + 0.5 \lg_{5,1} l_5 \dot{\theta}_3 + 0.5 \lg_{5,1} l_5 \dot{\theta}_3 + 0.5 \lg_{5,1} l_5 \dot{\theta}_3 + 
    0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_3 \cos(\theta_2)^2 - 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 - 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2)^2 - 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2)^2 + 0.5 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 + 0.5 \lg_{5,2} m_5 \dot{\theta}_5 \cos(\theta
0.5 \lg_{11} \lg_{22} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 0.5 \lg_{11} \lg_{52} m_5 \dot{\theta}_3 \cos(\theta_4)^2 + 0.5 \lg_{51} \lg_{52} m_5 \dot{\theta}_4 \cos(\theta_3)^2 - 0.5 \lg_{51} \lg_{52} m_5 \dot{\theta}_5 \cos(\theta_2)^2 + 0.5 \lg_{51} \lg_{52} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.5 \lg_{52} 
    0.5 \log_{11} \log_{22} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 0.5 \log_{11} \log_{22} m_5 \dot{\theta}_4 \cos(\theta_4)^2 + 0.5 \log_{11} \log_{22} m_5 \dot{\theta}_5 \cos(\theta_3)^2 + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5)^2 + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.5 \log_{11} \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.5 \log_{11} m_5
    0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_4)^2 + 0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 - 0.25 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 - 0.25 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 - 0.25 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 - 0.25 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
    0.25 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(\theta_4) \cos(\theta_4)
    0.25 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_3)^2 + 0.25 I_{yy,4} \dot{\theta}_3 \cos(\theta_3)^2 + 0.25
    0.25 I_{vv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{vv,4} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta
    0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{\text{xx},3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{\text{xx},3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{\text{xx},3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_3) \cos(\theta_3) \cos(
    I_{xz,4}\dot{\theta}_2\cos(2.0\,\theta_2)\cos(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_2\cos(2.0\,\theta_2)\cos(\theta_4)\sin(\theta_3)+0.5\,I_{xz,4}\dot{\theta}_3\sin(2.0\,\theta_2)\cos(\theta_3)\cos(\theta_4)+
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0.5 I_{xz,4} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.25 I_{yy,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,3} \dot{\theta}_3 \cos(\theta_2) + 0.25 I_{yy,3} \dot{\theta}_3 \dot{\theta}
    0.5 I_{xy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 I_{xy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 I_{xy,4} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 I_{xy,4} \dot{\theta}_5 \sin(2.0 \theta_4) \cos(\theta_2)
    0.5 I_{xy,3} \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.5 I_{xy,3} \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - I_{yz,4} \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 I_{xy,3} \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 I_{xy,3} \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 0.5 I_{xy,3} \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta
    0.5 I_{vz.4} \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 I_{vz.4} \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 I_{vz.4} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 I_{vz.4} \dot{\theta}_5 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - 0.5 I_{vz.4} \dot{\theta}_5 \sin(\theta_4) -
    0.5 I_{\text{vz},4} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 I_{\text{xz},4} \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 I_{\text{xz},4} \dot{\theta}_4 \sin(\theta_4) - 0.5 I_{\text{xz}
    0.25 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) + 0.25 I
    0.25 I_{\text{xv}.5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} - 0.5 \, a_2 \, \text{lc}_{2,3} \, m_2 \, \dot{\theta}_2 \cos{(2.0\,\theta_2)} - a_2 \, \text{lc}_{3,3} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_2)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} - 0.125 \, a_3 \, \text{lc}_{3,2} \, m
    0.125 a_3 \log_{12} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) - a_2 \log_{13} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) - a_2 \log_{13} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) - \log_{11} \log_{13} m_2 \dot{\theta}_2 \cos(2.0 \theta_2) - \log_{13} \log_{13} m_2 \dot{\theta}_2 \cos(2.0 \phi_2) - \log_{13} m_2 \dot{\theta}_2 \cos(2
    0.25 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) - 0.25 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) - 0.125 I_{xx.5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos
    0.125 I_{xx.5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.125 I_{xx.5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.125 I_{xx.5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{xx.5} \dot{\theta}_4 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} 
    0.125 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.125 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.125 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
    0.125 I_{xx.5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.125 I_{xx.5} \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.125 I_{xx.5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 I_{xx.5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
    0.125 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.125 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.125 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
    0.125 I_{\text{VV},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{VV},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.125 I_{\text{VV},5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{VV},5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{VV},5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} 
    0.125 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.125 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 0.125 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
    0.125 I_{\text{vv},5} \dot{\theta}_4 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.125 I_{\text{vv},5} \dot{\theta}_4 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.125 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)
    0.125 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.125 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.5 a_2 \log_{10} m_2 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.125 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
    0.25 \, a_3 \, \ln_{3.1} \, m_3 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) - 0.125 \, a_3 \, \ln_{3.1} \, m_3 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) - 0.125 \, a_3 \, \ln_{3.1} \, m_3 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) + 0.25 \, a_4 \, \ln_{4.1} \, m_4 \,
    0.25 a_5 lc_{5.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) +
    0.25 I_{xy,5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{xy,5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 I_{xy,5} \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 I_{xy,5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.25 I_{xy,5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} + 0.25 I_{xy,5} \dot
    0.25 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 
0.25\,I_{\text{xy},5}\,\dot{\theta}_4\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)} - 0.25\,I_{\text{xy},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{xy},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{xy},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{xy},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{xy},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{xy},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_5)} - 0.2
    0.25\,I_{\text{xx},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)} + 0.125\,I_{\text{xx},5}\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.125\,I_{\text{xx},5}\,\dot{\theta}_3\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.125\,I_{\text{xx},5}\,\dot{\theta}_3\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.125\,I_{\text{xx},5}\,\dot{\theta}_3\,\sin{(2.0\,\theta_5)} + 0.125\,I_{\text{xx},5}\,\dot{\theta
    0.125 I_{xx.5} \dot{\theta}_4 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{xx.5} \dot{\theta}_5 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{yy.5} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{yy.5} \dot{\theta}_3 \sin{(2.0\,\theta_5)} - 0.125 I_{yy.5} \dot{\theta}_4 \sin{(2.0\,\theta_5)} - 0.125 I_{yy.5} \dot{\theta}_5 \sin{(2.0\,\theta_5)} + 0.125
    0.125 I_{\text{vv},5} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{\text{vv},5} \dot{\theta}_4 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{\text{vv},5} \dot{\theta}_5 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{\text{vv},5} \dot{\theta}_5 \sin{(2.0\,\theta_5)} + 0.125 
    0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)}^2 + 0.0625 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)}^2 + 0.0625 \, \dot
    0.25 a_3^2 m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 a_3^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 +
0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_2)} \sin{(\theta_2)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \sin{(\theta_2)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \cos{(
    0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(
    0.25 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta
    0.25 a_3^2 m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 a_3^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.0625 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_2) - 0.0625 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.0625 a_4^2 m_4 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.0625 a_4^2 m_4 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.0625 a_4^2 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.0625 a_5^2 \dot{\theta}_5 \cos(\theta_5) + 0.0625 a_5^2 \dot{\theta}_5 \cos(\theta_5
    0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_
    0.25 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.25 a_4^2 m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) - 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.00625 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.0625 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.0625 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.0625 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) - 0.0625 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) - 0.0625 a_5^
    0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} 
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    0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_
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0.0625 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.25 a_4^2 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}
    0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \sin(\theta_4) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \sin(\theta_4) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 \, \dot
    0.0625 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,4} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)
    2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3
    2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos
    2.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5)^2 + 2.0 I_{xy
    2.0 I_{xy,5} \dot{\theta}_4 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 2.0 I_{xy,5} \dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 2.0 I_{xy,5} \dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_4)^2} + 2.0 I_{xy,5} \dot{\theta}_5 \cos{(\theta_5)^2} + 2.0 I_{xy
    2.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 2.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5)^2 + 2.0 I_
    2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.25 I_{c_{3,1}}^2 m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5)^2 + 0.0 I_{xy,5} \dot{\theta
    0.25 \log_{10}^{2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 \log_{10}^{2} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 \log_{10}^{2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) \cos(\theta_
0.25 \log_{11}{}^2 m_3 \dot{\theta}_2 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{11}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{12}{}^2 m_3 \dot{\theta}_2 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{11}{}^2 m_3 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{11}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{11}{}^2 m_3 \dot{\theta
    0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{3,1}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{3,
0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{2}) \sin (\theta_{2}) - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{2}) \sin (\theta_{2}) - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{3}) \sin (\theta_{3}) - 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25
    0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{4} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25
    0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (\theta_{2}) \sin (\theta_{2}) - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{4} \cos (\theta_{3}) \sin (\theta_{3}) - 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25
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    0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{4}) \sin (\theta_{4}) - 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (\theta_{4}) \sin (\theta_{4}) - 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{2} \cos (\theta_{2}) \sin (\theta_{2}) - 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25
    0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 
    0.25 \log_{5.1}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{5.1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5.2}{}^2 \cos{(\theta_2)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5.2}{}^2 \cos{(\theta_2)} \cos{(\theta_2)}
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 
    0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 
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    0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 \cos{(\theta_5)} \cos{
0.25 \log_{12} m_5 \dot{\theta}_4 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \log_{12} m_5 \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \log_{12} m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{11} m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \log_{12} m_5 \dot{\theta}_5 
    0.25 \log_{2} 2^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{5}) \sin(\theta_{5}) - 0.25 \log_{2} 2^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5}) \sin(\theta_{5}) - 0.5 a_{1} a_{2} m_{2} \dot{\theta}_{2} \cos(\theta_{2}) - a_{1} a_{2} m_{3} \dot{\theta}_{2} \cos(\theta_{2}) - a_{1} a_{2} m_{3} \dot{\theta}_{2} \cos(\theta_{2}) - a_{2} a_{3} m_{3} \dot{\theta}_{2} \cos(\theta_{2}) - a_{3} a_{4} a_{5} \cos(\theta_{2}) - a_{5} a
    0.375 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - a_1 \, \mathrm{lc}_{2,1} \, m_2 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.5 \, a_2 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} - 0.75 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} - 0.75 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.00 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.00 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.00 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, d_5 \, \mathrm{lc}_{5,1} \, m_5 \, d_5 \, \mathrm{lc}_{5,1} \, m_5 \, d_5 \, \mathrm{lc}_{
    0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} - 0.75 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} - a_1 \, \log_3 m_2 \, \dot{\theta}_2 \, \sin{(\theta_2)} - a_1 \, \log_3 m_3 \, \dot{\theta}_2 \, \sin{(\theta_2)} - 0.5 \, a_2 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_1 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_2 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + a_3 \, \log_3 n_3 \, \dot{\theta}_3 \, \cos{(\theta_
    a_1 \log_{10} a_1 \log_{10} a_2 \sin(\theta_2) = 0.75 a_3 \log_{10} a_1 \log_{10} a_2 \sin(\theta_2) = 0.75 a_4 \log_{10} a_2 \sin(\theta_2) = 0.75 a_4 \log_{10} a_2 \sin(\theta_2) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) = 0.03125 a_4^2 m_4 \dot{\theta}_3 \sin(2.0 \theta_4) 
    0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) - 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_4) \, d
    0.125 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} 
    0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, 
    0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_3^2 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_
    0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} 
    0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \cos{(\theta_4)} \sin{(2.0 \, \theta_2)} + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} - 0.0625 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(2.0 \, \theta_2)} \sin
    0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.5 \, \log_{10}^{2} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, \log_{10}^{2} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.00 \, \sin{(\theta_3)} + 0.
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 $0.5 \log_{3.1}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{3.2}{}^2 m_3 \dot{\theta}_2 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \log_{3.1}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{3.1}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{3.1}{}^2 \cos{(\theta_3)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{3.1}{}^2 \cos{(\theta_3)} \cos{(\theta_3)}^2 \cos{(\theta_3)} \cos{(\theta_3)}^2 \cos{(\theta_3)} \cos{(\theta_$ $0.5 \log_{3,2}{}^2 m_3 \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{3,2}{}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{3,2}{}^2 \cos{(\theta_3)} \cos{(\theta_3)$ $0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{2}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{2}) \cos (\theta_{4})^{2} \sin (\theta_{2}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,1}^{2} m$ $0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{2}) - 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0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \operatorname{lc}_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_$ $0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{($ $0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{2} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) - 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0.5 \log_{4,2}^{2} m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{4,2}^{2} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 \log_{4,2}^{2} m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{4,2}^{2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{4,2}^{2} m_4 \dot{\theta}_4 \cos(\theta_4) + 0.5 \log_{4,2}^{2} m$ $0.5 \operatorname{lc}_{4,2}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{2})^{2} \cos (\theta_{4}) \sin (\theta_{4}) - 0.5 \operatorname{lc}_{4,1}^{2} m_{4} \dot{\theta}_{4} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,2}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,2}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,2}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,2}^{2} \sin (\theta_$ $0.5 \operatorname{lc}_{4,2}^{2} m_{4} \dot{\theta}_{4} \cos (\theta_{3}) \cos (\theta_{4})^{2} \sin (\theta_{3}) - 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0.5 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3$ $0.5 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_3) + 0.5 \log_{10} 2 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{10} 2 \cos(\theta_2) \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{10} 2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{10} 2 \cos(\theta_4) \cos(\theta_$ $0.5 \log_{11}^{2} m_5 \dot{\theta}_4 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.5 \log_{11}^{2} m_5 \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{11}^{2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \log_{11}^{2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{11}^{2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_2)}^2 \cos{(\theta_2)} \cos{(\theta_2)}^2 \cos{(\theta_2)}^2$ $0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos (\theta_{2}) \cos (\theta_{5})^{2} \sin (\theta_{2}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{4})^{2} \sin (\theta_{2}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{3}) \sin (\theta_{3}) - 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0.5 \log_{5.1}^{2} m_5 \dot{\theta}_4 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5$ $0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_4 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5)$ $0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_4)^2} \sin{(\theta_2)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} - 0.5 \log_{5,2}{^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 \log_{5,2}{^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 \log_{5,2}{^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 \log_{5,2}{^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 \log_{5,2}{^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 \log_{5,2}{^2} \cos{(\theta_4)^2} \cos{($ $0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2})^{2} \cos(\theta_{4}) \sin(\theta_{4}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{2}) \cos(\theta_{5})^{2} \sin(\theta_{2}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{2}) \cos(\theta_{4})^{2} \sin(\theta_{2}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{2})^{2} \sin(\theta_{2}) + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin(\theta_{2}) + 0.5 \log_{5,2$ $0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})} \sin{(\theta_{3})} - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \sin{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{2})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \sin{(\theta_{2})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{2})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin{(\theta_{5})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin{(\theta_{5})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin{(\theta_{5})} + 0.5 \log_{5,2}^{2} m_{5}$ $0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 \log_{5,1}{}^2 \cos(\theta_5) + 0.5 \log_{5,1}$ $0.5 \log_{10} 2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{10} 2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{10} 2 \cos(\theta_5) \cos(\theta_5)$ $0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})} \cos{(\theta_{4})^{2}} \sin{(\theta_{3})} - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{4})} \sin{(\theta_{4})} + 0.5 \log_{5,2}^{2} m_{$ $0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_3$ $0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{$ $0.5 \log_{5,1}{^2} m_5 \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_5)^2} \sin{(\theta_3)} - 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_4 \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5)}$ $0.5 \log_{10} 2 \cos(\theta_4) \sin(\theta_4) - 0.5 \log_{10} 2 \cos(\theta_4) \sin(\theta_4) - 0.5 \log_{10} 2 \cos(\theta_2) \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5$ $0.5 \log_{12} 2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \sin(\theta_3) - 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 \log_{12} 2 m_5 \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)^2$ $0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_3 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.5 \log_{5,1}{^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,1}{^2} \cos{(\theta_5)} \cos{(\theta_5)}$

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0.5 \log_{10}^{2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10}^{2} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 \log_{10}^{2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 \log_{10}^{2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0
    0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{
    0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})} \cos{(\theta_{5})^{2}} \sin{(\theta_{3})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{
    0.5 \log_{2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) - 0.5 \log_{2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{2})^{2} \cos(\theta_{4}) \sin(\theta_{4}) - 0.5 \log_{1}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 0.5 \log_{1}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5}) \sin(\theta_{5}
    0.5 \log_{5,1}{^2} m_5 \dot{\theta}_4 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_4 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} \cos{(\theta_5)
    0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5}) \sin(\theta_{5}) + 0.5 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin(\theta_{5}) + 0.5 \log_{5,2
    0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(\theta_2)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_5)^2} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} \cos{(\theta_5)^2} \cos
0.5 \log_{10}^{2} m_5 \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 \log_{10}^{2} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 \log_{10}^{2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10}^{2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0
    0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} \cos{(
    0.5 \log_{5,2}{2} m_5 \dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,1}{2} m_5 \dot{\theta}_5 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{2} m_5 \dot{\theta}_4 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{2} m_5 \dot{\theta}_5 \cos{(\theta_5)
    0.5 \log_{5,2}^{2} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 \log_{5,2}^{2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{5,2}^{2} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 \log_{5,2}^{2} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 0.5 \log_{5,2}^{2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{5,2}^{2} m_5 \dot{\theta}_5 \cos(\theta
    0.5 \log_{3} 2 \log_{3} m_{3} \dot{\theta}_{2} \cos(2.0 \theta_{2}) \cos(\theta_{3}) + 0.25 \log_{3} 2 \log_{3} m_{3} \dot{\theta}_{3} \cos(2.0 \theta_{2}) \cos(\theta_{3}) - 0.25 \log_{4} 1 \log_{4} 2 m_{4} \dot{\theta}_{2} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) + 0.25 \log_{3} 2 \log_{3} 2 \log_{3} 2 \log_{3} 2 \log_{4} 2 \log_{4
    0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \phi_4) + 0.25 \log_{4.2} m_4 \dot{\theta}_4 \cos(2
    0.5 a_2 \log_2 m_3 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(\theta_3) \sin(2.0 \theta_2) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(\theta_3) \sin(2.0 \theta_2) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) \sin(2.0 \theta_2) - 0.25 \log_2 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(2.0
    0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(2.0 \, \theta_2) + 0.125 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) - 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.25 \, \alpha_3 \, \log_{3.3} m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, d_3 \, \cos(2.0 \, \theta_3) \, d_3 \, \cos(2.0 \, \theta_3) \, d_3 \, d_3
    0.125 \, a_3 \, \mathrm{lc}_{3.3} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, d_{\theta_4} \, d_{
    0.5 a_3 lc_{4.3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) - 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) - 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_3 lc_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) 
    0.125 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(2.0 \, \theta_2) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) - 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(2.0 \, \theta_2) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \dot{\theta}_3 \, d_3 \, d_3
    0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} +
    0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_4 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, 
    0.5 a_3 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.5 a_3 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_2) + 0.25 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta
    0.25 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_{\phi}_3 \, d_{\phi}_3 \, 
    0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, d_5 \, 
    0.125 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_2) \, \sin(\theta_3) + 0.5 \, a_2 \, a_3 \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) \, \sin(\theta_3) - 0.25 \, a_2 \, a_3 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_2) \, \sin(\theta_3) + 0.5 \, a_3 \, a_3 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_3 \, a_3 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_3 \, a_3 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_3 \, a_3 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_3 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_3 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_3 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(\theta_3) + 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, a_4 \, \dot{\theta}_4 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \dot{\theta}_6 
    0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) \, \sin(\theta_3) - 0.25 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_2) \, \sin(\theta_3) - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) \, \sin(\theta_5) + 0.00 \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, 
    0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.5 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc_{3.1} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, d\phi_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, d\phi_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, d\phi_3 \, d\phi_
    0.25 \log_{11} \log_{33} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 \log_{31} \log_{33} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(2.0 \theta_2) + I_{xz,5} \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{xz,5} \sin(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.
    0.5 a_2 \log_{11} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_3) - 0.25 a_2 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{11} m_4 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_4) + 0.25 \log_{11} m_4 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_4) + 0.25 \log_{11} m_4 \dot{\theta}_4 \sin(2.0 \theta_2) \sin(\theta_4) + 0.25 \log_{11} m_4 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_4) + 0.25 \log_{11} m_5 \dot{\theta}_5 \sin(2.0 \theta_4) + 0.25 \log_{11} m_5 \dot{\theta}_5 \sin(2.0 \theta_4) + 0.25 \log_{11} m_5 \dot{\theta}_5 \sin(2.0 \theta_4) + 0.25 \log_{11} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_
    0.125 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \,
    0.125 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, 
    0.5 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_3) + 0.25 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_3) + 0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0
    0.25 \log_{4} \log_{4} \log_{4} m_{4} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) - 0.25 \log_{4} \log_{4} \log_{4} m_{4} \dot{\theta}_{4} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) - I_{vz, 5} \dot{\theta}_{2} \cos(2.0 \theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \sin(\theta_{5}) - 0.25 \log_{4} \log_{4} m_{4} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \cos(\theta_{3}) 
    I_{\text{vz},5} \dot{\theta}_2 \cos(2.0 \,\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - I_{\text{vz},5} \dot{\theta}_2 \cos(2.0 \,\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 I_{\text{vz},5} \dot{\theta}_3 \sin(2.0 \,\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_3 \sin(2.0 \,\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_3 \sin(2.0 \,\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
    0.5 I_{vz,5} \dot{\theta}_4 \sin{(2.0\,\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} - 0.5 I_{vz,5} \dot{\theta}_5 \sin{(2.0\,\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} + 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)}^2 + 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_5)} + 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} + 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.
    0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
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0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2
0.25 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + 0.000 \, \sin{(\theta_2)} + 0.000 \, \cos{(\theta_2)} \, \cos{(\theta_2)} + 0.000 \, \cos{(\theta_2)} \, \cos{
0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta
0.25 a_3^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 a_3^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - I_{xz,5} \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{xz,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - I_{xz,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - I_{xz,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + I_{xz,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(\theta_5) + I_{xz,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + I_{xz,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(
I_{xz,5}\,\dot{\theta}_2\,\cos\left(2.0\,\theta_2\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_5\right) - I_{xz,5}\,\dot{\theta}_2\,\cos\left(2.0\,\theta_2\right)\,\cos\left(\theta_5\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_4\right) - 0.5\,I_{xz,5}\,\dot{\theta}_3\,\sin\left(2.0\,\theta_2\right)\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - I_{xz,5}\,\dot{\theta}_2\,\cos\left(2.0\,\theta_2\right)\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) + I_{xz,5}\,\dot{\theta}_3\,\sin\left(\theta_3\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_3\right) + I_{xz,5}\,\dot{\theta}_3\,\sin\left(\theta_3\right)\,\sin\left(\theta_3\right) + I_{xz,5}\,\dot{\theta}_3\,\sin\left(\theta_3\right)\,\sin\left(\theta_3\right) + I_{xz,5}\,\dot{\theta}_3\,\sin\left(\theta_3\right) +
0.5 I_{xz,5} \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 I_{xz,5} \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 I_{xz,5} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_5 \sin(\theta_4) - 0.5 I_{xz,5} \dot{\theta}_5 \sin(\theta_4) - 0.5 I_{xz,5} \dot{\theta}_5 \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_5 \sin(\theta_5)
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0.5 I_{xz.5} \dot{\theta}_5 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 I_{xz.5} \dot{\theta}_5 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.25 I_{c_{4.1}}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{c_{4.1}} \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_4) - 0.5 I_{c_{4.1}} \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_4) + 0.25 I_{c_{4.1}} \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{2} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{3}) \sin (2.0 \,\theta_{4}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{3}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \,\theta_{3}) \sin 
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0.25 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{4}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{4}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{3}) \sin (2.0 \theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (2.0 \theta_{3}) \sin (2.0 \theta
0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \sin (2.0 \,\theta_{4}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{4}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} - 0.25 \operatorname{lc}_{3,1}{}^{2} m_{3} \dot{\theta}_{2} \cos (2.0 \,\theta_{3}) \cos (\theta_{2}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{3,1}{}^{2} m_{3} \dot{\theta}_{2} \cos (2.0 \,\theta_{3}) \cos (\theta_{2}) + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \sin (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \cos (\theta_{2})^{2} + 0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos (2.0 \,\theta_{3}) \sin (2.0 \,\theta_{3}) \cos (2
0.25 \log_{11}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{12}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) 
I_{xx,4}\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2) + I_{xx,4}\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3) + I_{xx,4}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2) + I_{xx,4}\dot{\theta}_3\cos(\theta_4)^2\sin(\theta_2) + I_{xx,4}\dot{\theta}_3\cos(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4) + I_{xx,4}\dot{\theta}_3\cos(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin(\theta_4)^2\sin
I_{\text{xx}.5} \dot{\theta}_2 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4)^2 \sin (\theta_2) + I_{\text{xx}.4} \dot{\theta}_2 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4) \sin (\theta_4) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_2)^2 \cos (\theta_3) \cos (\theta_4)^4 \sin (\theta_3) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_4)^2 \cos (\theta_4)^2 \sin (\theta_3) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_4)^2 \cos (\theta_4)^2 \cos (\theta_4)^2 \sin (\theta_3) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_4)^2 \cos (\theta_4)^2 \sin (\theta_4) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_4)^2 \cos (\theta_4)^2 \sin (\theta_4) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_4)^2 \sin (\theta_4) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_4)^2 \cos (\theta_4)^2 \sin (\theta_4) + I_{\text{xx}.4} \dot{\theta}_3 \cos (\theta_4)^2 \cos
I_{xx,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)
I_{xx,5} \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + I_{xx,4} \dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} + I_{xx,4} \dot{\theta}_4 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} + I_{xx,4} \dot{\theta}_4 \cos{(\theta_4)^2} \sin{(\theta_4)} + I_{xx,4} \dot{\theta}_4 \cos{(\theta_4)^2} \cos{
I_{xx,5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_5)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)+I_{xx,5}\dot{\theta}_2\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_2\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)
I_{xx,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2) + I_{xx,5}\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3) + I_{xx,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2) + I_{xx,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2) + I_{xx,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2) + I_{xx,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^
I_{xx.4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + I_{xx.5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + I_{xx.5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + I_{xx.5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + I_{xx.5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + I_{xx.5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \cos(\theta_
I_{xx,5}\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\sin(\theta_4)+I_{xx,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3
I_{\text{xx},5} \dot{\theta}_5 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4)^2 \sin (\theta_2) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_3) \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_3) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_5)^2 \sin (\theta_4) + I_{\text{xx},5} \dot{\theta}_2 \cos (\theta_5)^2 \sin (\theta_5) + I_{\text{xx},5} \dot{\theta}_3 \cos (\theta_5)^2 \sin (\theta_5)^2 \sin (\theta_5)^2 \cos (\theta_5)^2 \sin (\theta_5)^
I_{xx,5}\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5) + I_{xx,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_2) + I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_5)^3\sin(\theta_3) + I_{xx,5}\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^
I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\sin(\theta_4) + I_{xx,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2) + I_{xx,5}\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3) + I_{xx,5}\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^
I_{xx,5}\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) + I_{xx,5}\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{xx,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_3) + I_{xx,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) + I_{xx,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) + I_{xx,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta
I_{xx.5}\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) + I_{xx.5}\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5) + I_{xx.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_2) + I_{xx.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos
I_{xx,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + I_{xx,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + I_{xx,5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(
I_{xx,5}\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - I_{xx,5}\dot{\theta}_3\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{xx,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)^3\sin(\theta_3) + I_{xx,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - I_{xx,5}\dot{\theta}_3\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_5) - I_{xx,5}\dot{\theta}_3\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_5) - I_{xx,5}\dot{\theta}_3\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(
I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4)+I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5)-I_{xx,5}\dot{\theta}_3\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5)+I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5)
I_{xx,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - I_{xx,5}\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{xx,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)^3\sin(\theta_3) + I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_5) - I_{xx,5}\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^3\sin(\theta_5) - I_{xx,5}\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^3\sin(\theta_5) - I_{xx,5}\dot{\theta}_4\cos(\theta_3)^3\cos(\theta_4)^3\cos(\theta_5)^3\sin(\theta_5) - I_{xx,5}\dot{\theta}_5\cos(\theta_3)^3\cos(\theta_5)^3\sin(\theta_5) - I_{xx,5}\dot{\theta}_5\cos(\theta_5)^3\sin(\theta_5) - I_{xx,5}\dot{\theta}_5\cos(\theta_5)^3\cos(\theta_5)^3
I_{xx,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + I_{xx,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - I_{xx,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + I_{xx,5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)
I_{xx.5}\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - I_{xx.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{xx.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - I_{xx.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_5) - I_{xx.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) - I_{xx.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2
I_{\text{vv},4}\dot{\theta}_2\cos\left(\theta_2\right)\cos\left(\theta_3\right)^2\cos\left(\theta_4\right)^2\sin\left(\theta_2\right) - I_{\text{vv},4}\dot{\theta}_2\cos\left(\theta_2\right)^2\cos\left(\theta_3\right)\cos\left(\theta_4\right)^2\sin\left(\theta_3\right) - I_{\text{vv},4}\dot{\theta}_3\cos\left(\theta_4\right)\cos\left(\theta_4\right)^2\sin\left(\theta_2\right) - I_{\text{vv},4}\dot{\theta}_3\cos\left(\theta_4\right)\cos\left(\theta_4\right)^2\sin\left(\theta_4\right) - I_{\text{vv},4}\dot{\theta}_3\cos\left(\theta_4\right)\cos\left(\theta_4\right)\cos\left(\theta_4\right)^2\sin\left(\theta_4\right) - I_{\text{vv},4}\dot{\theta}_3\cos\left(\theta_4\right)\cos\left(\theta_4\right)\cos\left(\theta_4\right)\cos\left(\theta_4\right) - I_{\text{vv},4}\dot{\theta}_3\cos\left(\theta_4\right)\cos\left(\theta_4\right)\cos\left(\theta_4\right)\cos\left(\theta_4\right) - 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I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_4)^2 \sin(\theta_4) - I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4) - I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4) - I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4) - I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4) - I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_4
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I_{\text{vv},4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2) - I_{\text{vv},5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2) - I_{\text{vv},5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3) - I_{\text{vv},6}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3) - I_{\text{vv},8}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3) - I_{\text{vv},8}\dot{\theta}_2\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3) - I_{\text{vv},8}\dot{\theta}_2\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3) - I_{\text{vv},8}\dot{\theta}_2\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos
    I_{\text{yy},5}\,\dot{\theta}_3\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)^2\cos\left(\theta_4\right)^2\,\sin\left(\theta_2\right) - I_{\text{yy},4}\,\dot{\theta}_3\cos\left(\theta_2\right)^2\cos\left(\theta_3\right)^2\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{yy},4}\,\dot{\theta}_4\cos\left(\theta_2\right)^2\cos\left(\theta_3\right)\cos\left(\theta_4\right)^2\,\sin\left(\theta_3\right) - I_{\text{yy},4}\,\dot{\theta}_4\cos\left(\theta_2\right)^2\cos\left(\theta_3\right)\cos\left(\theta_4\right)^2\,\sin\left(\theta_3\right) - I_{\text{yy},4}\,\dot{\theta}_3\cos\left(\theta_3\right)\cos\left(\theta_4\right)^2\,\sin\left(\theta_3\right) - I_{\text{yy},4}\,\dot{\theta}_3\cos\left(\theta_3\right)\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_3\right)^2\cos\left(\theta_
    I_{\mathrm{yy},5}\,\dot{\theta}_{2}\,\cos\left(\theta_{2}\right)\,\cos\left(\theta_{4}\right)^{2}\cos\left(\theta_{5}\right)^{2}\,\sin\left(\theta_{2}\right)-I_{\mathrm{yy},5}\,\dot{\theta}_{2}\cos\left(\theta_{2}\right)^{2}\,\cos\left(\theta_{3}\right)\,\cos\left(\theta_{5}\right)^{2}\,\sin\left(\theta_{3}\right)-I_{\mathrm{yy},5}\,\dot{\theta}_{2}\cos\left(\theta_{2}\right)^{2}\cos\left(\theta_{4}\right)\,\sin\left(\theta_{4}\right)-I_{\mathrm{yy},5}\,\dot{\theta}_{2}\cos\left(\theta_{5}\right)^{2}\,\sin\left(\theta_{5}\right)
    I_{\text{vv},5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2)-I_{\text{vv},5}\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)-I_{\text{vv},5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2)-I_{\text{vv},5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_3)
    I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
    I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta
    I_{\text{vv.5}}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_3) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4) - I_{\text{vv.5}}\dot{\theta}_2\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos
    I_{\text{vv.}5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) - I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) - I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) - I_{\text{vv.}5} \dot{\theta}_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - I_{\text{vv.}5} \dot{\theta}_5 \cos(\theta_5)^2 \cos(\theta_5)^2
    I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta
    I_{\text{vv},5} \, \dot{\theta}_2 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - I_{\text{vv},5} \, \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + I_{\text{vv},5} \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_3)} - I_{\text{vv},5} \, \dot{\theta}_3 \cos{(\theta_5)^2} \sin{(\theta_5)} + I_{\text{vv},5} \, \dot{\theta}_3 \cos{(\theta_5)^2} \sin{(\theta_5)^2} + I_{\text{vv},5} \, \dot{\theta}_3 \cos{(\theta_5)^2} + I_{\text{vv},5} \, \dot{\theta}_3
         I_{\text{vv},5} \,\dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - I_{\text{vv},5} \,\dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} - I_{\text{vv},5} \,\dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - I_{\text{vv},5} \,\dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - I_{\text{vv},5} \,\dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_3)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - I_{\text{vv},5} \,\dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_
    I_{\text{vv.}5} \dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_5)^2} \sin{(\theta_3)} - I_{\text{vv.}5} \dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - I_{\text{vv.}5} \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - I_{\text{vv.}5} \dot{\theta}_2 \cos{(\theta_5)^2} \sin{(\theta_5)} + I_{\text{vv.}5} \dot{\theta}_2 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} - I_{\text{vv.}5} \dot{\theta}_2 \cos{(\theta_5)^2} 
    I_{\text{vv.}5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + I_{\text{vv.}5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv.}5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(
    I_{\text{vv},5} \dot{\theta}_4 \cos{(\theta_2)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - I_{\text{vv},5} \dot{\theta}_4 \cos{(\theta_2)^2} \cos{(\theta_5)} \sin{(\theta_5)} + I_{\text{vv},5} \dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - I_{\text{vv},5} \dot{\theta}_4 \cos{(\theta_5)^2} \sin{(\theta_5)} + I_{\text{vv},5} \dot{\theta}_3 \cos{(\theta_5)^2} \sin{(\theta_5)} + I_{\text{vv},5} \dot{\theta}_3 \cos{(\theta_5)^2} \cos{(\theta_5)
    I_{yy,5}\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) + I_{yy,5}\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) + I_{yy,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_3) - I_{yy,5}\dot{\theta}_5\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) + I_{yy,5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) + I_{yy,5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5
    I_{\text{vv},5}\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) - I_{\text{vv},5}\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5) + I_{\text{vv},5}\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) - I_{\text{vv},5}\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5) + I_{\text{vv},5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5) - I_{\text{vv},5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_5) + I_{\text{vv},5}\dot
    I_{yy.5}\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4) + I_{yy.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5) + I_{yy.5}\dot{\theta}_5\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\sin(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)^2\cos(\theta_5)
    I_{vz,5}\dot{\theta}_2\cos(2.0\,\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.5\,I_{vz,5}\dot{\theta}_3\sin(2.0\,\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.5\,I_{vz,5}\dot{\theta}_3\sin(2.0\,\theta_2)\cos(\theta_4)\sin(\theta_5) + 0.5\,I_{vz,5}\dot{\theta}_3\sin(2.0\,\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.5\,I_{vz,5}\dot{\theta}_3\sin(2.0\,\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.5\,I_{vz,5}\dot{\theta}_3\sin(2.0\,\theta_2)\cos(\theta_4)\sin(\theta_5) + 0.5\,I_{vz,5}\dot{\theta}_3\sin(2.0\,\theta_2)\cos(\theta_5)\cos(\theta_5) + 0.5\,I_{vz,5}\dot{\theta}_3\sin(2.0\,\theta_2)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_
    0.5 I_{vz.5} \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 I_{vz.5} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_5 \sin(\theta
    0.5 I_{vz.5} \dot{\theta}_4 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 I_{vz.5} \dot{\theta}_5 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_5 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_5 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_5 \dot{\theta}_5 \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_5 \dot{
    0.5 I_{\text{vz}.5} \dot{\theta}_5 \sin{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_2 a_3 m_3 \dot{\theta}_2 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} - 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_
    0.5 a_2 a_3 m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 a_3 m_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.5 a_2 a_3 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.5 a_2 a_3 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3)
    0.25 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_5 \, a_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_5 \, a_5 \, a_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.0625 \, a_5 \, 
    0.5 I_{xz,5} \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_4 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(2.0 \theta_2) \sin(2.
    0.5 \, a_1 \, \mathrm{lc}_{3.2} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_2)} + 0.5 \, a_1 \, \mathrm{lc}_{3.2} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_2 \, \mathrm{lc}_{3.1} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)}
    0.25 a_3 \ln_4 a_2 m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 \ln_4 a_2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 \ln_4 a_2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 \ln_4 a_2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 \ln_4 a_2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_3 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_3 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_3 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_3 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_3 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_3 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 \ln_4 a_3 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2
    0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_
    0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(\theta_2) - 0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_2 \, \sin(\theta_3) \, \cos(\theta_2) - 0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_2) + 0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_3 \, \sin(\theta_3) \, \cos(\theta_2) + 0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_3 \, \sin(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) \, \cos(\theta_3) \, \cos(
    0.5 a_1 a_3 m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) - 0.5 a_1 a_3 m_4 \dot{\theta}_2 \sin(\theta_3) \cos(\theta_2) - 0.5 a_1 a_3 m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) + 0.5 a_1 a_3 m_4 \dot{\theta}_3 \sin(\theta_3) \cos(\theta_2) + 0.5 a_1 a_2 m_4 \dot{\theta}_3 \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta
    0.5 a_1 a_3 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) - 0.5 a_1 a_3 m_5 \dot{\theta}_2 \sin(\theta_3) \cos(\theta_2) - 0.5 a_1 a_3 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) + 0.5 a_1 a_3 m_5 \dot{\theta}_3 \sin(\theta_3) \cos(\theta_2) + 0.5 a_1 a_2 m_5 \dot{\theta}_3 \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta
0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_
    0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \dot{
    0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_2)} \sin{(\theta_4)} + 0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \sin{(2.0 \, \theta_2)} \cos{(\theta_4)} - 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \cos{(2.0 \, \theta_3)} \sin{(\theta_4)} - 0.000 \sin{(\theta_4)} + 0.000 \sin{(\theta_4)} + 0.000 \sin{(\theta_4)} + 0.000 \sin{(\theta_4)} + 0.000 \cos{(\theta_4)} + 0.000 \cos{(\theta_4
    0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.00 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.00 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.00 \, a_5 \, 
    0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, 
    0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.5 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc_{3.2} \, lc_{3.3}} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)}
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0.5 a_1 \log_{11} m_3 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) - 0.5 a_1 \log_{11} m_3 \dot{\theta}_2 \sin(\theta_3) \cos(\theta_2) - 0.5 a_1 \log_{11} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) + 0.5 a_1 \log_{11} m_3 \dot{\theta}_3 \sin(\theta_3) \cos(\theta_2) + 0.5 a_1 \log_{11} m_3 \dot{\theta}_3 \sin(\theta_3) \cos(\theta_3) \cos(
    0.5 a_2 \log_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) + 0.25 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3
    0.25 a_2 \log_{3.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta
    0.125 \, a_3 \, \log_3 \, m_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) - 0.125 \, a_3 \, \log_3 \, m_3 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_2) \, \cos(\theta_3) + 0.25 \, a_3 \, \log_4 \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_2) \, \sin(\theta_4) + 0.00 \, \sin(\theta_4) \, \cos(\theta_4) \, \sin(\theta_4) \, \sin(\theta_4) \, \sin(\theta_4) \, \sin(\theta_4) \, \sin(\theta_4) \, \sin(\theta_4) \, \cos(\theta_4) \, \sin(\theta_4) \, \cos(\theta_4) \, \sin(\theta_4) \, \cos(\theta_4) 
    0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \cos{(2.
    0.5 a_3 lc_{4.1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 lc_{4.1} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4.1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(2.0 \theta_2) \sin(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0 \theta_2) \sin(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0
    0.125 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, a_3 \, 
    0.25 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0\,\theta_3)} \, \cos{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_2)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0\,\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \mathrm{lc}_{
    0.5 a_3 \log_{3.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_3 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(2
    0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} - 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, 
    0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.125 \, a_4 \, a_3 \, a_3 \, \dot{\theta}_3 
    0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, d_5^2 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(2.0 \, 
    0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \,
0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
0.03125\,a_5{}^2\,m_5\,\dot{\theta}_5\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_4)} - 0.03125\,a_5{}^2\,m_5\,\dot{\theta}_5\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)} - 0.5\,\mathrm{lc}_{3,1}\,\mathrm{lc}_{3,3}\,m_3\,\dot{\theta}_2\,\cos{(2.0\,\theta_2)}\,\sin{(\theta_3)} - 0.03125\,a_5{}^2\,m_5\,\dot{\theta}_5\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)
0.5 \, \mathrm{lc}_{3.1} \, \mathrm{lc}_{3.3} \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,3} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} - 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc}_{3,1} \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + 0.25 \, \mathrm{lc}_{3,2} \, 
0.5 a_3 \log_{12} m_3 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 - 0.5 a_3 \log_{12} m_3 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 a_4 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 a_4 \log_{12} m_4 \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 \log_{12} m_4 \dot{\theta}_3 \cos(\theta_3
0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 - 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 
    0.5 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)}
    0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta
    0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_5)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_3
    0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos{(\theta_4)}^2 \cos{(
    0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_5)^2 - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4)^2 - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4)^2 - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 
0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 + 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_5)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.5 \, a_5 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{
    0.5 a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5)^2 - 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.5 a_1 \log_{12} m_3 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_2) + 0.5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 0.5 \log_{
    0.5 a_1 \log_2 m_3 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_2) + 0.5 a_2 \log_3 m_3 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_3) + 0.25 a_2 \log_3 m_3 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_3) - 0.5 \log_3 m_3 \dot{\theta}_3 \sin(\theta_3) \sin(
    0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.125 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.125 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4
    0.25 a_3 lc_{4,2} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(\theta_4) - 0.25 a_4 lc_{5,1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) - 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_2) \sin
    0.125 \lg_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} + 0.125 \lg_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin
    0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{3} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} - 0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{3} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{4})} - 0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{3} \cos{(2.0\,\theta_{4})} \cos{(2.0\,\theta_{5})} \sin{(2.0\,\theta_{5})} - 0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{3} \cos{(2.0\,\theta_{5})} \sin{(2.0\,\theta_{5})} \sin{(2
    0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.125 \lg_{5,2}{}^2 \sin{(2.0\,\theta_5)} - 0.125 \lg_{5,2}{}^2 \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.125 \lg_{5,2}{}^2 \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0
    0.125 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{4})} \sin{(2.0 \,\theta_{5})} - 0.125 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{4})} - 0.125 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} + 0.125 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_
    0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(
    0.125 \log_{10} 2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 \log_{10} 2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.125 \log_{10} 2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 \log_{10} 2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 \log_{10} 2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
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0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{4})} \sin{(2.0 \,\theta_{5})} + 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{4})} + 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} + 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} + 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.
   0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,\theta_5)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,\theta_5)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,\theta_5)} + 0.125 \lg_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0\,
   lc_{3,1}lc_{3,2}m_3\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_3)^2 - lc_{3,1}lc_{3,2}m_3\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_3)^2 + lc_{4,1}lc_{4,2}m_4\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_3)^2 + lc_{4,1}lc_{4,2}m_4\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_2)^2 + lc_{4,1}lc_{4,2}m_4\dot{\theta}_2\cos(\theta_2)^2 + lc_{4,1}lc_{
   lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_3)^2+lc_{4,1}lc_{4,2}m_4\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_4)^2+lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_4)^2+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)^2+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2-lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^
   |c_{4,1}|c_{4,2}m_4\dot{\theta}_3\cos(\theta_3)^2\cos(\theta_4)^2+|c_{4,1}|c_{4,2}m_4\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_4)^2-|c_{4,1}|c_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_4)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_2)^2\cos(\theta_3)^2+|c_{4,1}|c_{4,2}m_4\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_4)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2+|c_{5,1}|c_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 + lc_{5,2} lc_{5,2}
   lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_4)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(\theta_2)^2\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_2)^2\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_2)^2 + lc_{
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 + lc_{5,1}
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_5)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + lc_{5,2} lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} lc_{
   lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_4)^2\cos(\theta_5)^2 - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_5)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_2)^2\cos(\theta_5)^2 - lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_4)^2 - lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_4)^2 - lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot
   lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(\theta_4)^2\cos(\theta_5)^2-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_5)^2-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_4)^2\cos(\theta_5)^2+0.5lc_{3,2}lc_{3,3}m_3\dot{\theta}_2\sin(2.0\,\theta_2)\sin(\theta_3)+0.5lc_{3,2}lc_{3,3}m_3\dot{\theta}_2\sin(2.0\,\theta_2)\sin(\theta_3)
   0.25 \log_{3} 2 \log_{3} m_{3} \dot{\theta}_{3} \sin(2.0 \theta_{2}) \sin(\theta_{3}) - 0.03125 a_{5}^{2} m_{5} \dot{\theta}_{2} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.03125 a_{5}^{2} m_{5} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.03125 a_{5}^{2} m_{5} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.03125 a_{5}^{2} m_{5} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.03125 a_{5}^{2} m_{5} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.03125 a_{5}^{2} m_{5} \dot{\theta}_{3} \sin(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \sin(2.0 \theta_{5}) + 0.03125 a_{5}^{2} m_{5} \dot{\theta}_{5} \sin(2.0 \theta_{5}) \sin
   0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - I_{\text{xv},3} \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - I_{\text{xv},3} \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + I_{\text{xv},3} \, \dot{\theta}_3 \, \sin{(\theta_3)} + I_{\text{xv},3} \, \dot{\theta}_3 \, \sin{(\theta_3)} + I_{\text{xv},3} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + I_{\text{xv},3} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + I_{\text{xv},3} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + I_{\text{xv},3} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos
   I_{xv,3}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)+I_{xv,4}\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)+I_{xv,4}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)+I_{xv,4}\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)
   I_{xy,5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)+I_{xy,4}\dot{\theta}_2\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_4)+I_{xy,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)+I_{xy,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)
   I_{\text{xv},5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + I_{\text{xv},4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_6 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_6 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_6 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + I_{\text{xy},6} \dot{\theta}_6 \cos(\theta_4) \cos(
   I_{xy,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)+I_{xy,4}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+I_{xy,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_4)+I_{xy,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)
   I_{xy,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_4)+I_{xy,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)-I_{xy,4}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+I_{xy,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)
   I_{xv,5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + I_{xv,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + I_{xv,5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) - I_{xv,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + I_{xv,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + I_{xv,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + I_{xv,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + I_{xv,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + I_{xv,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
   I_{xv,4}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+I_{xv,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_5)\sin(\theta_2)\sin(\theta_5)-I_{xv,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+I_{xv,5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)
   I_{xy.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_4)+I_{xy.5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)+I_{xy.5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_5)\sin(\theta_2)\sin(\theta_5)-I_{xy.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)
   I_{xv.5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)-I_{xv.5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)+I_{xv.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_2)\sin(\theta_5)-I_{xv.5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4)
   I_{xv,5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + I_{xv,5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - I_{xv,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - I_{xv,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - I_{xv,5} \dot{
   I_{xv.5}\dot{\theta}_3\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)-I_{xv.5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)-I_{xv.5}\dot{\theta}_4\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)-I_{xv.5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_5)
   I_{xv.5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.125 \log_{10}^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 \log_{11}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 \log_{11}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(
   0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \sin{(2.0\,\theta_{3})} \sin{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} + 0.125 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \sin{(2.0\,\theta_{3})} \sin{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} - 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \sin{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} + 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \sin{(2.0\,\theta_{5})} + 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \sin{(2.0\,\theta_{
   0.125 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \sin{(2.0\,\theta_5)} - 0.125 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \sin{(2.0\,\theta_5)} + 0.125 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \sin
   0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_4 \, a_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} + 0.5 \, a_5 \, a_
   0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, I_{\text{xv}, 5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, I_{\text{xv}, 5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.5 \, I_{\text{xv}, 5} \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \,
   0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.5 I_{\text{xv.}5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)}^2 + 0.25 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(\theta_2)}^2 - 0.25 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(\theta_2)}^2 - 0.25 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(\theta_2)}^2 - 0.25 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(\theta_2)}^2 - 0.25 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(\theta_2)}^2 - 0.25 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(\theta_2)}^2 - 0.25 \, a_3 \, \text{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)}
   0.5 a_1 \log_{12} m_3 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) - 0.5 a_1 \log_{12} m_3 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) + 0.5 a_2 \log_{11} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) + 0.5 a_2 \log_{11} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) - 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + 0.5 \log_{11} \log_{12} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + 0.5 \log_{11} \log_{11} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + 0.5 \log_{11} m_4 \dot{\theta}_4 \cos(\theta_4) + 0.5 \log_{11} 
   0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} - 0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 0.25 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_3 \, a_3 \, d_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)}
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   0.5 \, a_1 \, a_3 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 0.5 \, a_1 \, a_3 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 0.5 \, a_1 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_1 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, \dot{\theta}_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{
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0.5 a_1 a_3 m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) - 0.5 a_1 a_3 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2)^2 + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{11} \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{11} \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{11} \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{11} \log_{11} \log_{12} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{11} 
    0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
    0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5)
    0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
    0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx} = \dot{\theta}_4 \cos(2.0 \theta_5) \cos(
    0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5)
    0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(
    0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_4) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_4) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_4) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,
    0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5
    0.25 I_{yy} = \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{yy} = \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{yy} = \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{yy} = \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{yy} = \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{yy} = \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
    0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_4) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_4) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_4) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_5) \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_
    0.25 I_{\text{vv},5} \dot{\theta}_4 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)^2} + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} +
    0.25 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)}^2 + 0.25 I_{\text{vv},5} \dot{\theta}_5 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)}^2 +
    0.25 I_{xx,4} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{xx,4} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{xx,4} \dot{\theta}_4 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_
    0.25 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2
    0.25 a_3 \log_{11} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.5 a_1 \log_{11} m_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) - 0.25 a_3 \log_{11} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.5 a_1 \log_{11} m_3 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.5 a_1 \log_{11} m_3 \dot{\theta}_3 \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_3 \log_{11} m_3 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_2)
    0.5 a_1 \log_{10} a_2 \cos(\theta_3) \sin(\theta_2) - 0.5 a_1 \log_{10} a_3 \cos(\theta_2) \sin(\theta_3) - 0.5 a_1 \log_{10} a_3 \cos(\theta_3) \sin(\theta_2) + 0.25 a_3 \log_{10} a_3 \cos(\theta_2) \sin(\theta_2) + 0.25 a_3 \log_{10} a_3 \cos(\theta_3) \sin(\theta_2) + 0.25 a_3 \log_{10} a_3 \cos(\theta_3) \sin(\theta_3) + 0.25 a_3 \log_{10} a_3 \cos(\theta_3) \cos(\theta
    0.25 \, a_3 \, \log_{11} \, m_3 \, \dot{\theta}_3 \, \cos(\theta_2) \, \sin(\theta_2) + 0.25 \, a_3 \, \log_{11} \, m_3 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{11} \, m_3 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_2) \, \sin(\theta_2) - 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_2) \, \sin(\theta_3) + 0.25 \, a_3 \, \log_{11} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_4 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, \log_{11} \, m_5 \, d_5 \, \dot{\theta}_5 \, d_5 \, d_
    0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.2
    0.5 a_2 \ln_4 2 m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + 0.25 a_4 \ln_4 m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) + 0.25 a_4 \ln_4 m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) 
    0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)
    0.25 a_5 \ln 1 m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(
    0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 lc_{5,1} m
    0.25 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.75 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) + 0.75 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.75 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.75 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.75 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.75 \log_{1
    0.25 a_5 \ln 1 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.75 a_3 \ln 1 \cos(\theta_4) \sin(\theta_5) + 0.75 a_3 \ln 1 \cos(\theta_5) \sin(\theta_5) + 0.75 a_5 \ln 1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
    0.25 a_5 \ln 1 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln 1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25
    0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(\theta_3) \, \sin(\theta_4) - 0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) + 0.00 \, a_2 \, a_4 \, a_4 \, a_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) + 0.00 \, a_4 \, a_5 \, \dot{\theta}_5 \, \sin(\theta_3) \, \sin(\theta_4) + 0.00 \, a_5 \,
    0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, I_{xv,5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)^2} - 0.00 \, \sin{(\theta_5)} + 0.00 \, \cos{(\theta_5)} + 0.00 \, \sin{(\theta_5)} + 0.00
    0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 \theta_5 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
    0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
    0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
    0.5 I_{xy} = \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy} = \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
    0.5 I_{xy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.5 I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2)
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+0.5 I_{xy,4} \dot{\theta}_3 \cos{(2.0 \theta_4)} \sin{(2.0 \theta_3)} \cos{(\theta_2)} \sin{(\theta_2)} +0.5 I_{xy,4} \dot{\theta}_4 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} +0.5 I_{xy,4} \dot{\theta}_4 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_3)} \cos{(\theta_2)} \sin{(\theta_2)} +0.5 I_{xy,4} \dot{\theta}_4 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_3)} \cos{(\theta_2)} \sin{(\theta_2)} +0.5 I_{xy,4} \dot{\theta}_4 \cos{(2.0 \theta_3)} \cos{(\theta_2)} \cos{(2.0 \theta_3)} \cos{(2.0 \theta_3)}
    0.5 \, a_1 \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_1 \, \mathrm{lc}_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_2 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_
    0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.7
    0.25 I_{xx,5} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5)^2 + 0.25 I_{
    0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_5 \sin(2.0 \theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5
    0.25 I_{\text{vv},5} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{vv},5} \dot{\theta}_4 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{vv},5} \dot{\theta}_4 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{vv},5} \dot{\theta}_4 \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{vv},5} \dot{\theta}_5 \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} + 0.25 I_{\text{vv},5} \dot{\theta}_5 \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0
    0.25 I_{\text{vv},5} \dot{\theta}_5 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{xx},4} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{xx},4} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{xx},4} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{xx},4} \dot{\theta}_3 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)}
    0.25 I_{xx,4} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(2.0 \theta_3) \sin(2.
    0.25 I_{yy} + \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 a_2 a_3 m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.125 a_2 a_3 m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(2.0 
    0.5 a_2 a_3 m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 a_3 m_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 a_3 m_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 a_3 m_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 a_3 m_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 a_3 a_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(
    0.125 \, a_3^2 \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_3^2 \, m_3 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.125 \, a_3^2 \, m_3 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.125 \, a_3^2 \, m_3 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)} \cos{
    0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 \, \cos{(\theta_3)}^2 
    0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_2)} + 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_2)} + 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_2)} + 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_2)} + 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_2)}
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    0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_3)
    0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \cos{(
    0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_2)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \, \sin{(\theta_3)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)}^
    0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 
    0.125 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.125 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)
    0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta
    0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3
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0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.00 \, \sin{(\theta_4)} + 0.00 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.00 \, \sin{(\theta_4)} + 0.00 \, \cos{(\theta_4)} \, \cos{(\theta_4)}
    0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 0.125 \,
    0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos
    0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^
    0.125 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)
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0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5)
    0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(
         0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \cos{(
    0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \cos{(
         4.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5)^2 - 4.0 I_{xy,
         4.0 I_{xy.5} \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.5 a_2 l_{3.1} m_3 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(2.0 \theta_3) - 0.25 a_2 l_{3.1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) - 0.25 a_2 l_{3.1} m
         0.25 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.125 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
         0.125 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} - 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, 
         0.125 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.00 \, \sin{(\theta_5)} + 0
         0.5 a_4 \log_{10} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_3 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 \log_{10} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) - 0.5 \log_{10} m_
         0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_2 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right) \sin \left(\theta_3\right) - 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_2\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_2\right) - 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, \dot{\theta}_3 \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, d_3 \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, d_3 \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, d_3 \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, d_3 \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, d_3 \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, d_3 \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) + 0.5 \, \alpha_3 \, \log_{11} m_3 \, d_3 \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \cos \left(\theta_3\right) \sin \left(\theta_3\right) \cos \left(\theta_3
         0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)
         0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)}^3 + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)}^3 + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^3 \, \cos{(\theta_3)}^3 \, \sin{(\theta_3)}^3 + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)}^3 \, \cos
         0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \, \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta
         0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos
         0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)} \cos{(\theta_4
         0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_4) + 0.5 a_4 lc_{4,1}
         0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{
         0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3
    0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos{(\theta_2)^2} \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos{(\theta_2)} \cos{(\theta_3)^2} \sin{(\theta_2)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos{(\theta_4)^2} \sin{(\theta_4)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos{(\theta_4)^2} \sin{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)^2} \cos{(\theta_4)^2} 
         0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
    0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3)} \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3
    0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5)
         0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \sin(\theta_4) +
    0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5
         0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5
         0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 
         0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) 
    0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) + 0.5 \log_{1
         0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{11} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{11} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{11} m_
         0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) -
         0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_
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 $0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5$ $0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_2 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \dot{\theta}_4$ $0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) - 0.25 \, a_5 \,$ $0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_5 \,$ $0.25 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_3)}^$ $a_4^2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.25 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3$ $0.25 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)} \cos{(\theta_2)}^2 \cos{(\theta_2)$ $0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.25 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2$ $a_4^2 m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - a_4^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - a_4^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_4^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_4^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - a_4^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2$ $0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2$ $0.25 \, a_4^2 \, m_4 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos$ $0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta$ $0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2$ $a_4^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos($ $0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2$ $0.25 a_5^2 m_5 \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \sin{(\theta_4)} - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{($ $0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{$ $0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_3)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^$ $0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) - 0.25 a_5^2 m_5$ $0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos$ $0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_3)}^2 \cos{(\theta_3)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)$ $0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5$ $0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_3$ $0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^$ $0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \cos{(\theta_5)}^$ $0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2}$ $0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)}$ $0.5 a_2 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_2 lc_{4,1} m_4 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)$ $0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc_{5.1}} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta$ $0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - \mathrm{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - \mathrm{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - \mathrm{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - \mathrm{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - \mathrm{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - \mathrm{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - \mathrm{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)}$ $lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) + lc_{4,2}^2 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - lc_{4,2}^2 m_4 \dot{\theta}_3 \cos(\theta_4)^2 \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta$ $lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - lc_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) + lc_{4,2}^2 m_4 \dot{\theta}_2 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + lc_{4,2}^2 m_4 \dot{\theta}_3 \cos(\theta_4)^2 \sin(\theta_3) + lc_{4,2}^2 m_4 \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_$ $lc_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) - lc_{4,1}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) - lc_{4,1}{}^{2} m_{4} \dot{\theta}_{4} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \sin (\theta_{3}) + lc_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{3})^$ $lc_{4,2}{}^{2} m_{4} \dot{\theta}_{2} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} + lc_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} + lc_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} \sin{(\theta_{2})} - lc_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{3$ $lc_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) + lc_{4,2}^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos($ $|c_4|^2 m_4 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - |c_5|^2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - |c_5|^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos($

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lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{2})^{2}\cos(\theta_{3})\cos(\theta_{4})^{2}\sin(\theta_{3})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{2})\cos(\theta_{3})^{2}\cos(\theta_{4})^{2}\sin(\theta_{2})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{2})\cos(\theta_{3})^{2}\cos(\theta_{4})^{2}\sin(\theta_{2})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{2})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{3})\cos(\theta_{4})^{2}\sin(\theta_{2})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{2})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{3})\cos(\theta_{4})^{2}\sin(\theta_{3})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{3})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{4})^{2}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{4}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{4})+lc_{5,2}{}^{2}m_{5}\dot{\theta}_
   {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_2)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)} + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \cos{
   lc_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} \sin (\theta_{2}) - lc_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \sin (\theta_{3}) - lc_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{3})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta
   lc_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{4})^{2} \sin(\theta_{4}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5})^{2} \sin(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin(\theta_{5}) + lc_{5,2}^{2} m_
   {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_2)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta
   lc_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{2})} - lc_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} - lc_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} \sin{(\theta_{2})} + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_
   lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2})^{2} \cos(\theta_{4}) \sin(\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{4}) \sin(\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{4}) \sin(\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{4}) \sin(\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{4}) \sin(\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{4}) \sin(\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{4}) \sin(\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \sin(\theta_{4}) + lc_{5,2}{}^{2} m_
   lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{3})\cos(\theta_{4})^{2}\cos(\theta_{5})^{2}\sin(\theta_{3})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{2})^{2}\cos(\theta_{4})\cos(\theta_{5})^{2}\sin(\theta_{4})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{2})^{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\cos(\theta_{5})\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\sin(\theta_{5})-lc_{5,1}{}^{2}m_{5}\dot{\theta}_{2}\sin
   {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_2)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)}^2 \cos{(\theta_3)} + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_2)} + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_5 + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_5 + {\rm lc_
   lc_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) - lc_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{2}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_{5}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_{5}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_
   lc_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})} \cos{(\theta_{5})}^{2} \sin{(\theta_{2})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \sin{(\theta_{5})} + lc_{5,2}{}^{2} 
    lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \sin (\theta_{3}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) - lc_{5,1}^{2} m_{5} \dot{\theta}_{2} \cos (\theta_{2})^{2} \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{5}) - lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{5}) \sin (\theta_{5}) + lc_{5,2}^
   lc_{5,1}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} - lc_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} - lc_{5,1}{}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})}^{2} \sin{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})}^{2} \sin{(\theta_{5
   \log_{10}(10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2} + 10^{-2}
   lc_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \sin{(\theta_{5})
   lc_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{2}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{5})^{2} \sin(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{5})^{2} \sin(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \sin(\theta_{5}) + lc_{5,2}^{2} m_
    lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{2})} + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})} \cos{(\theta_{4})^{2}} \sin{(\theta_{3})} + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{3})^{2}}
   lc_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,
   lc_{5,1}^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - lc_{5,1}^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - lc_{5,1}^2 m_5 \dot{\theta}_4 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)
   lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{2})}^{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} - lc_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \sin{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,2}{
   lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{2})^{2}\cos(\theta_{4})\cos(\theta_{5})^{2}\sin(\theta_{4}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{2})^{2}\cos(\theta_{3})^{2}\cos(\theta_{5})\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\cos(\theta_{2})\cos(\theta_{4})^{2}\cos(\theta_{5})^{2}\sin(\theta_{2}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\cos(\theta_{2})\cos(\theta_{5})^{2}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\cos(\theta_{5})^{2}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\cos(\theta_{5})^{2}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\cos(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\cos(\theta_{5})^{2}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta}_{5}\sin(\theta_{5}) + lc_{5,2}{}^{2}m_{5}\dot{\theta
lc_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})}{}^{2} \cos{(\theta_{4})}{}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})}{}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}{}^{2} \sin{(\theta_{4})} + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})} \cos{(\theta_{5})}{}^{2} \sin{(\theta_{3})} - lc_{5,1}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,1}{}^{2} 
   lc_{5,1}^2 m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - lc_{5,1}^2 m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,2}^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,2}^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,2}^2 m_5 \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) + lc_{5,2}^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin
   lc_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2})^{2}} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} - lc_{5,2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} - lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})} \cos{(\theta_{5})^{2}} \sin{(\theta_{3})} + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} - lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})^{2}} \cos{
   lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \sin{(\theta_{
lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{2})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - lc_{5,2}^{2} m_{5} \dot{\theta}_{4} \cos(\theta_{3})^{2} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) - lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5}) \sin(\theta_{5}) - lc_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_{5}) - lc_{5,
   lc_{5,2}^2 m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_5 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,2}^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,2}^2 m_5
   lc_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{2})}^{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} - lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} - lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5}
   \log_{5.2} 2m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \log_{4.2} m_4 \dot{\theta}_4 \cos(\theta_2)^2 - 0.5 \log_{4.2}
   0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 - \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} - 0.25 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \,
   0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(
   0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (A28)
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C_{12} = I_{xx,2}\dot{\theta}_2\sin(\theta_2) + I_{xz,2}\dot{\theta}_1\cos(2.0\,\theta_2) - 0.5\,I_{xx,2}\dot{\theta}_1\sin(2.0\,\theta_2) - 0.25\,I_{xx,3}\dot{\theta}_1\sin(2.0\,\theta_2) - 0.25\,I_{xx,4}\dot{\theta}_1\sin(2.0\,\theta_2) - 0.25\,I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_2) - 0.25\,I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_2) - 0.25\,I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_2) - 0.
    0.25 I_{xx,5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} - 0.25 I_{yy,3} \dot{\theta}_1 \sin{(2.0\,\theta_2)} - 0.25 I_{yy,4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} - 0.25 I_{yy,5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} + 0.5 I_{zz,2} \dot{\theta}_2 \sin{(2.0\,\theta_2)} + 0.5 I_{zz,
    0.5 I_{zz,3} \dot{\theta}_1 \sin(2.0 \theta_2) + 0.5 I_{zz,4} \dot{\theta}_1 \sin(2.0 \theta_2) + 0.5 I_{zz,5} \dot{\theta}_1 \sin(2.0 \theta_2) - I_{vz,2} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{zz,3} \dot{\theta}_3 \cos(\theta_2) - 0.5 I_{zz,3} \dot{\theta}_3 \cos(\theta_2)
    0.5 I_{zz,4} \dot{\theta}_3 \cos(\theta_2) - 0.5 I_{zz,4} \dot{\theta}_4 \cos(\theta_2) - 0.5 I_{zz,5} \dot{\theta}_3 \cos(\theta_2) - 0.5 I_{zz,5} \dot{\theta}_4 \cos(\theta_2) - 0.5 I_{zz,5} \dot{\theta}_5 \cos(\theta_2) + 0.25 I_{xx,3} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) - 0.5 I_{zz,5} \dot{\theta}_5 \cos(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_
    0.25 I_{\text{vv},3} \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_2)} - 0.5 I_{\text{xv},3} \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_3)} + 0.5 I_{\text{xx},3} \dot{\theta}_3 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + I_{\text{vz},3} \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \cos{(\theta_3)} - 0.5 I_{\text{xv},3} \dot{\theta}_2 \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_3)} \cos{
    0.5 I_{\text{vv},3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) - I_{\text{xv},3} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) + I_{\text{xz},3} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) - I_{\text{xv},3} \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) + I_{\text{xz},3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_3)
    0.125 a_2^2 m_2 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.5 a_2^2 m_3 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.5 a_2^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.0625 a_3^2 m_3 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.0625 a_3^2 m_3
    0.5 a_2^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.25 a_3^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.25 a_3^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.0625 a_4^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.0625 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.0625 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_2) + 0.0625 a_5^2 m_5
    0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.5 \, I_{\text{xx},3} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.5 \, I_{\text{yy},3} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.5 \, I_{\text{xx},3} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.5 \, I_{\text{xx},3} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.5 \, I_{\text{xx},3} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.5 \, I_{\text{xx},3} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos
    0.5 \log_{1,1}{^2} m_2 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} - 0.5 \log_{1,3}{^2} m_2 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} + 0.25 \log_{1,1}{^2} m_3 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} + 0.25 \log_{1,2}{^2} m_3 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} - 0.5 \log_{1,2}{^2} m_3 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} + 0.25 \log_{1,2}{^2} m_3 \dot{\theta}_2 \sin{(2.0 \,\theta_2)} + 0.25 \log_{1,2}{^2} m_3 \dot{
    0.5 \log_{3.3}{}^2 m_3 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.5 \log_{4.3}{}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.25 \log_{4.3}{}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 \log_{4.3}{}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_2
    0.25 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.5 \log_{5.3}{}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) + I_{xz,3} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_2) + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta
    0.125\,a_3^2\,m_3\,\dot{\theta}_3\,\cos{(\theta_2)} - 0.5\,a_3^2\,m_4\,\dot{\theta}_3\,\cos{(\theta_2)} - 0.5\,a_3^2\,m_5\,\dot{\theta}_3\,\cos{(\theta_2)} - 0.125\,a_4^2\,m_4\,\dot{\theta}_3\,\cos{(\theta_2)} - 0.125\,a_4^2\,m_4\,\dot{\theta}_4\,\cos{(\theta_2)} - 0.125\,a_4^2\,m_4^2\,\dot{\theta}_4\,\cos{(\theta_2)} - 0.125\,a_4^2\,m_4^2\,
    0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos
    I_{yz,3} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) - 0.5 \log_{3,1}{}^2 m_3 \dot{\theta}_3 \cos(\theta_2) - 0.5 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \cos(\theta_2) - 0.5 \log_{4,1}{}^2 m_4 \dot{\theta}_3 \cos(\theta_2) - 0.5 \log_{4,1}{}^2 m_4 \dot{\theta}_4 \cos(\theta_2
    0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_
    0.5 \, \text{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - \text{lc}_{2,1} \, \text{lc}_{2,2} \, m_2 \, \dot{\theta}_2 \, \sin{(\theta_2)} - 0.5 \, I_{\text{xx},4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)
    0.5 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 
    0.5 I_{\text{vv},4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_3 \sin(2.0 \theta_4) 
    0.5 I_{yy,4} \dot{\theta}_4 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.25 \log_{3,1}{}^2 m_3 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_2)} + 0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_2)} + 0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_3
    I_{xy,4}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(\theta_2) + I_{yz,4}\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_3)\cos(\theta_4) - 0.125\,a_3^2\,m_3\dot{\theta}_3\cos(2.0\,\theta_3)\cos(\theta_2) - 0.125\,a_3^2\,m_3\dot{\theta}_3\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos
    0.5 a_3^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 a_3^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) + I_{xz,4} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + I_{xz,4} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_3^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) + I_{xz,4} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(\theta_4) + I_{xz,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) + I_{xz,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta
    0.5 \log_{3.1}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{3.2}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) - I_{vz,4} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 \log_{3.2}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{3.2}{}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta
    0.125\,a_3^2\,m_3\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_2)} + 0.5\,a_3^2\,m_4\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_2)} + 0.5\,a_3^2\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_2)} + 0.5\,lc_{3.1}^2\,m_3\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_2)} + 0.5\,lc_{3.1}^2\,m_3\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,d^2
0.5 \log_{3.2}{^2} m_3 \dot{\theta}_2 \sin{(2.0 \,\theta_3)} \sin{(\theta_2)} - 0.5 a_2 \log_{2.3}{m_2} \dot{\theta}_1 \cos{(2.0 \,\theta_2)} - a_2 \log_{3.3}{m_3} \dot{\theta}_1 \cos{(2.0 \,\theta_2)} - a_2 \log_{4.3}{m_4} \dot{\theta}_2 \cos{(2
    a_2 lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0 \theta_2)} - lc_{2.1} lc_{2.3} m_2 \dot{\theta}_1 \cos{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} - 0.25 I_{yy,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_2)} + 0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(
    0.5 \, a_2 \, \mathrm{lc}_{2,1} \, m_2 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3
    0.5 I_{xy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_4) - 0.5 I_{xy,4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) + I_{xz,4} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(2.0 \theta_4) \cos(\theta_4) 
    0.25 I_{xx,4} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 I_{yy,4} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - I_{yz,4} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0
    I_{\text{vz.4}} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - I_{\text{xz.4}} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 m_2 \dot{\theta}_1 \cos(\theta_2) - a_1 a_2 m_3 \dot{\theta}_1 \cos(\theta_2) - a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_2 a_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
    a_1 a_2 m_4 \dot{\theta}_1 \cos(\theta_2) - a_1 a_2 m_5 \dot{\theta}_1 \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0
    0.5 I_{\text{vv},4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - a_1 \ln \log \theta_1 \cos(\theta_2) - a_2 \ln \log \theta_2
    0.5 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc
    0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2) + lc_{2,2} lc_{2,3} m_2 \dot{\theta}_2 \cos(\theta_2) - I_{xv,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(
    I_{xy,4}\dot{\theta}_3\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) - I_{xy,4}\dot{\theta}_4\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) - I_{xy,4}\dot{\theta}_4\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) - I_{xy,4}\dot{\theta}_4\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2)
    a_1 \log_3 m_2 \dot{\theta}_1 \sin(\theta_2) - 0.5 a_2 \log_2 m_2 \dot{\theta}_2 \sin(\theta_2) - a_1 \log_3 m_3 \dot{\theta}_1 \sin(\theta_2) - a_1 \log_4 m_4 \dot{\theta}_1 \sin(\theta_2) - a_1 \log_3 m_5 \dot{\theta}_2 \sin(\theta_2
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0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \dot{\theta}_3 \,
   0.25 I_{\text{xx},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} + 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} + 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} + 0.25 I_{\text{yy},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
   0.25 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xy},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
   0.5 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} + I_{xz,5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} + 0.25 a_3 \log_{3,2} m_3 \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \dot{\theta}_1 \sin{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \dot{\theta}_2 \sin{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \dot{\theta}_3 \cos{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \dot{\theta}_3 \cos{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \dot{\theta}_3 \cos{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \cos{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \cos{(2.0\,\theta_3)} + 0.25 a_3 \log_{3,2} m_3 \cos{(2
   0.5 \, \text{lc}_{3.1} \, \text{lc}_{3.2} \, m_3 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
   0.25 I_{\text{xx},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
   0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
   I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_3\right) \,\cos\left(\theta_4\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_3\right) \,\cos\left(\theta_5\right) \,\sin\left(\theta_4\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_4\right) \,\cos\left(\theta_5\right) \,\sin\left(\theta_3\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_3\right) \,\cos\left(\theta_4\right) \,\cos\left(\theta_5\right) \,\sin\left(\theta_3\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_3\right) \,\cos\left(\theta_4\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_3\right) \,\cos\left(\theta_4\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_5\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_5\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_1 \,\cos\left(2.0\,\theta_2\right) \,\cos\left(\theta_5\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_2 \,\cos\left(\theta_5\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_3 \,\cos\left(\theta_5\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_4 \,\cos\left(\theta_5\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_5 \,\cos\left(\theta_5\right) \,\sin\left(\theta_5\right) - 
   0.5 I_{xx,5} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_5) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos
   I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + I_{yz,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_4) + I_{yz,5} \dot{\theta}_4 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) \cos(2.0 \theta_5) \cos(2.0 
0.5 I_{xx.5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx.5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) +
   0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_
   0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} - \ln{_{3.2} \ln_{3.3} m_3} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + I_{\text{xv}.5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} + I_{\text{xv}.5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5
   I_{xy,5}\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + I_{xy,5}\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) + I_{xy,5}\dot{\theta}_3\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.
   I_{xy,5}\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + I_{xy,5}\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) + I_{xy,5}\dot{\theta}_4\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.
   I_{xy,5}\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + I_{xy,5}\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) + I_{xy,5}\dot{\theta}_5\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.
   a_2 \log_{3.2} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) + 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(
   0.5 \, a_3 \, \mathrm{lc}_{3\,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} - a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \,
   a_3 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) - 0.5 a_4 \log_{3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) + 0.5 a_2 a_3 m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) + a_2 a_3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) + a_3 \log_{3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) + a_4 \log_{3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) + a_5 \log_{3} m_5 \dot{\theta}_2 \sin(\theta_3) + a_5 \log_{3} m_5 \dot{\theta}_1 \sin(\theta_3) + a_5 \log_{3} m_5 \dot{\theta}_2 \sin(\theta_3) + a_5 \log_{3} m_5 \dot{\theta}_3 \cos(\theta_3) + a_5 \log_{3} m_5 \dot{\theta
   a_2 a_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) - 0.0625 a_4^2 \sin(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(2.0 \theta_
   0.25 a_4^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) + lc_{3.1} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - lc_{3.1} lc_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + lc_{3.1} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - lc_{3.1} lc_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + lc_{3.1} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - lc_{3.1} lc_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + lc_{3.2} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - lc_{3.1} lc_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + lc_{3.2} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) - lc_{3.1} lc_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + lc_{3.2} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_3) + lc_{3.2} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_3) + lc_{3.2} lc_{3.2} lc_{3.2} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_3) + lc_{3.2} 
   lc_{3,1}lc_{3,2}m_3\dot{\theta}_3\sin(2.0\,\theta_3)\cos(\theta_2)+0.5I_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\sin(\theta_2)+0.5I_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\sin(\theta_2)+0.5I_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta
   0.5 I_{xx,5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(\theta_2)} + 0.5 I_{xx,5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{xx,5} \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)}
   0.5 I_{xx.5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx.5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx.5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx.5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
   0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_
   0.5\,I_{\text{xx},5}\,\dot{\theta}_5\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)} - 0.5\,I_{\text{yy},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\sin{(\theta_2)} - 0.5\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(\theta_2)} - 0.5\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta
   0.5 I_{yy.5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_3 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{
   0.5 I_{\text{VV},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{VV},5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 
   0.5 I_{yy.5} \dot{\theta}_4 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_5 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_5 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{yy.5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{
   0.5 I_{\text{vv}.5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{\text{vz}.5} \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_2 \log_{10} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) + a_2 \log_{10} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) + a_3 \log_{10} m_3 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \cos
   0.5 a_3 \log_{1.1} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 a_3 \log_{1.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_4) - 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(2.0 
   0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) - I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) - I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) - I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5)
   I_{\text{XV}} = \hat{\theta}_2 \cos(2.0\,\theta_4) \sin(2.0\,\theta_5) \sin(2.0\,\theta_5) \sin(2.0\,\theta_5) \sin(2.0\,\theta_5) \sin(2.0\,\theta_5) \sin(2.0\,\theta_5) \sin(2.0\,\theta_4) \sin(2.0\,\theta_5) \sin
   I_{\text{xv.5}}\dot{\theta}_4\sin{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}-I_{\text{xv.5}}\dot{\theta}_5\sin{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}-I_{\text{xz.5}}\dot{\theta}_2\cos{(\theta_2)}\cos{(\theta_3)}\cos{(\theta_4)}\sin{(\theta_5)}-I_{\text{xv.5}}\dot{\theta}_2\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}
   I_{xz.5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-I_{xz.5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+0.0625a_4^2m_4\dot{\theta}_1\sin(2.0\theta_2)\sin(2.0\theta_3)\sin(2.0\theta_4)+0.0625a_4^2m_4\dot{\theta}_1\sin(2.0\theta_2)\sin(2.0\theta_3)\sin(2.0\theta_4)+0.0625a_4^2m_4\dot{\theta}_1\sin(2.0\theta_3)\sin(2.0\theta_3)\sin(2.0\theta_4)+0.0625a_4^2m_4\dot{\theta}_1\sin(2.0\theta_3)\sin(2.0\theta_3)\sin(2.0\theta_3)\sin(2.0\theta_4)
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0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.5 \, I_{xx,5} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \,
   I_{vz,5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+I_{vz,5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+I_{vz,5}\dot{\theta}_2\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+I_{vz,5}\dot{\theta}_2\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)
   0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + I_{xz,5} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
   0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.25 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, d_5 \, d_
   a_1 \ln_{3.2} m_3 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) - 0.5 a_3 \ln_{3.3} m_3 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) - a_3 \ln_{4.1} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) - a_3 \ln_{4.3} m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) - a_3 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) - a_3 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) - a_3 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) - a_3 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos
   0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_5) + a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_5) + a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) + a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_3) \, d_4 \, d_5 
   0.5 \, a_4 \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \cos(\theta_5) - 0.5 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_1 \, \cos(\theta_2) \, \sin(\theta_3) - a_1 \, a_3 \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \sin(\theta_3) - a_1 \, a_3 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \sin(\theta_3) + a_1 \, a_3 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \sin(\theta_3) - a_1 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \sin(\theta_3) + a_2 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \sin(\theta_3) - a_3 \, a_3 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_3) - a_4 \, a_3 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_3) - a_4 \, a_3 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_3) - a_4 \, a_3 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_3) - a_4 \, a_3 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_3) - a_4 \, a_3 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_3) - a_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, 
   0.5 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) + a_2 \, a_3 \, m_4 \, \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) + a_2 \, a_3 \, m_5 \, \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \cos(\theta_2) \sin(\theta_5) + a_5 \, a_
   0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.00 \, \sin{(\theta_5)} + 0.00 \, \cos{(\theta_5)} + 0.0
   0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 
   lc_{3,1}lc_{3,3}m_3\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)-a_1lc_{3,1}m_3\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)+a_2lc_{3,1}m_3\dot{\theta}_2\cos(\theta_3)\sin(\theta_2)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_4)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}m_4\dot{\theta}_3\cos(\theta_3)+a_3lc_{4,2}
   0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, d^2 \, d^2
0.5 \, \text{lc}_{4.1}{}^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{
   0.5 \log_{4,2}^2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + \log_{3,2} \log_{3,3} m_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) - a_2 \log_{3,2} m_3 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) + a_2 \log_{3,2} m_3 \dot{\theta}_2 \sin(\theta_3) + a_2 \log_{3,2} m_3 \dot{\theta}_2 \sin(\theta_3) + a_3 \log_{3,2} m_3 \dot{\theta}_3 \cos(\theta_3) + a_3 \log_{3,2} m_3 \dot{\theta}_3 \sin(\theta_3) + a_3 \log_{3,2} m_3 \dot{\theta}_3 \cos(\theta_3) + a_3 \log_{3,2} m_3 \dot{
   0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \,
   0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.
0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4,1}}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.5 \, \mathrm{lc_{4,1}}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, 
   0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{
0.5 \, \text{lc}_{4.2}^{2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \,
   0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_3 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)}
   0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \,
   0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - lc_{4,1} lc_{4,2} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_2) - lc_{4,1} lc_{4,2} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_2)
   0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_5) - 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
   0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0
   0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
   0.5 a_3 a_4 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.25 a_3 a_4 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3
   0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, \mathrm
   0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta
   0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - \ln_{4,2} \ln_{4,3} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + a_3 \ln_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
   a_3 \ln_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_2) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) - a_3 \ln_{4.2} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4) - a_3 \ln_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta
   0.5 a_4 \log_4 a_3 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_4 \log_4 a_3 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) + 0.5 a_3 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_4 \log_4 a_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(
   0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) - a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_5 lc_{5,2} lc_{5,3} lc_{5,4} lc_{5,4
   a_4 \log_{10} a_5 = a_4 \log_{10} a_5 = a_5 
   0.5 a_3 a_4 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_2) + 0.5 a_3 a_4 m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) 
   a_3 a_4 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_2) + 0.25 a_3 a_4 m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_3 \sin(\theta_4) + a_4 m_5 \dot{\theta}_4 \sin(\theta_4) \sin(\theta_4) + a_4 m_5 \dot{\theta}_4 \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_6) \cos(\theta
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0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, d_5 \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, a_5 \, d_5 
    0.5 \log_{10} 2 \log_{10}
    0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta
    0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta
    lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_3)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_4)\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_1\sin(2.0\,\theta_2)\cos(\theta_3)\sin(\theta_4)+a_2lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\sin(2.0\,\theta_2)\cos(\theta_3)\sin(\theta_4)+a_2lc_{4,1}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_{4,3}lc_
    a_2 \ln a_1 \ln a_2 \ln a_3 \ln a_4 \ln a_4 \ln a_1 \ln a_2 \ln a_2 \ln a_3 \ln a_4 
    a_3 \log_{1.1} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.5 a_3 \log_{1.1} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) - 0.5 a_3 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
    0.5\,a_3\,\mathrm{lc_{5\,1}}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\cos{(\theta_5)}\,\sin{(\theta_4)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\sin{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\sin{(\theta_2)} - 0.125\,a_5{}^2\,m_5
    0.125\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_3\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_3\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_3\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_3\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.125\,a_5{}^2\,m_5\,\dot{\theta}_3\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5
    0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, 
    0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, d_5 \, 
    0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, d_5 \, d
    0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
    lc_{4,2} lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - a_3 lc_{4,2} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(\theta_2) \sin(\theta_4) + a_4 lc_{4,2} lc_{4,3} lc_{4,3} lc_{4,4} lc_{4,3} lc_{4,4} l
    0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{
    0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 
    0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{3} \cos{(2.0 \,\theta_{4})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} - 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{3} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{3})} \sin{(2.0 \,\theta_{4})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{3} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,
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    0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} - 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{^2} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{^2} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{^2} \cos{(2.0 \,\theta_5)} \cos
    0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{4})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} - 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{3})} \sin{(2.0 \,\theta_{4})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{3})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{2})} + 0.5 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 
    0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{
    0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,
0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.125 \, a_5^{\, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} + 0.00 \, \mathrm{sin}_{4,1} \, m_4 \, \dot{\theta}_{1,2} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} + 0.00 \, \mathrm{sin}_{4,1} \, m_4 \, \dot{\theta}_{1,2} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} + 0.00 \, \mathrm{sin}_{4,1} \, m_4 \, \dot{\theta}_{1,2} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} + 0.00 \, \mathrm{sin}_{4,1} \, m_4 \, \dot{\theta}_{1,2} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} + 0.00 \, \mathrm{sin}_{4,2} \, \mathrm{sin}_{4
    0.5 \log_{5.1}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.
    0.25 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} - a_1 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} - a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)}
    0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) - a_4 lc_{5,3} m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) + a_3 lc_{5,2} m_5 \dot{\theta}_3 cos(\theta_2) cos(\theta_4) + a_5 lc_{5,2} lc_{5
    0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_1 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5
    0.5 a_1 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
    0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \cos(\theta_5) \cos(
    0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_5 \, a
    0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} + 0.5 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta
    0.5 \operatorname{lc}_{4.1} \operatorname{lc}_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) - \operatorname{lc}_{4.1} \operatorname{lc}_{4.3} m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 \operatorname{lc}_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - \operatorname{lc}_{4.1} \operatorname{lc}_{4.3} m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 \operatorname{lc}_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - \operatorname{lc}_{4.1} \operatorname{lc}_{4.3} m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 \operatorname{lc}_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - \operatorname{lc}_{4.1} \operatorname{lc}_{4.3} m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 \operatorname{lc}_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_3
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a_1 \ln a_1 \ln a_1 \ln a_2 \ln a_1 \ln a_2 \ln a_2 \ln a_2 \ln a_1 \ln a_2 
a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) 
0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, d_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, d_5 
lc_{4,2}lc_{4,3}m_4\dot{\theta}_2\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)+lc_{4,2}lc_{4,3}m_4\dot{\theta}_2\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)+a_1lc_{4,2}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_1lc_{4,2}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)
a_2 \ln_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - a_2 \ln_{4.2} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3
a_4 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
0.5 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + a_4 \, a_5 \, \dot{\theta}_3 \, \sin(\theta_3) \, \sin(\theta_4) + a_5 \, a_5 \, a_5 \, \cos(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + a_5 \, a_5 \, a_5 \, \cos(\theta_2) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) + a_5 \, a_5 \, \cos(\theta_2) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) + a_5 \, a_5 \, \cos(\theta_2) \, \sin(\theta_3) \, \cos(\theta_3) \,
lc_{4,1}lc_{4,3}m_4\dot{\theta}_2\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-0.5a_4lc_{4,1}m_4\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_2)-a_2lc_{4,1}m_4\dot
0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.25 a_3 a_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0
0.5 a_3 lc_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + 0.5 a_4 lc_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4.2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_4) \cos
0.5 a_4 lc_{4,2} m_4 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.2} lc_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.2}
lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos
lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) + 0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_2)\sin(\theta_4) + 0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\sin(2.0\,\theta_2)\sin(2.0\,\theta_3)\cos(\theta_4) + 0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\sin(2.0\,\theta_3)\cos(\theta_4) + 0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2
0.5 a_4 lc_{4,1} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_
0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.25 a_3 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0
0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0
0.25 a_5 \log_{10} a_5 
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) + a_3 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} 
0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_3 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 a_5 \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 a_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)}
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_4) - 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) - 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
a_2 \ln \ln a_2 \ln a_3 \ln a_3 \ln a_4 \ln a_4 \ln a_5 \ln a_
a_3 \ln 1 + a_5 
0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3) + 0.25\,a_5\,lc_{5,2}m_5\dot{\theta}_1\sin(2.0\,\theta_2)\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) - 0.25\,a_5\,lc_{5,2}m_5\dot{\theta}_1\sin(2.0\,\theta_2)\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)
a_2 \ln a_2 \ln a_3 \ln a_3 \ln a_4 \ln a_4 \ln a_4 \ln a_5 
a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
a_3 \ln c_5 = m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \ln c_5 = m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_5) \cos(\theta_
0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5
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0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_
   0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \,
   0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_4 \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_4 \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_5 \sin(\theta_5) - 0.5 a_2 a_5 \dot{\theta}_5 \sin(\theta_5) - 0.5 a_2 a_5 \dot{\theta}_5 \sin(\theta_5) - 0.
   0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a
   0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_2)} \, 
   0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{1.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{1.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
   lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_5)} + lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} - a_2 lc_{5.1} m_5 \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} - a_2 lc_{5.1} m_5 \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} - a_2 lc_{5.1} m_5 \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - a_2 lc_{5.1} m_5 \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_2 lc_{5.1} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_3 lc_{5.2} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_3 lc_{5.2} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_3 lc_{5.2} lc_{5.3} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_3 lc_{5.2} lc_{5.2} lc_{5.2} lc_{5.2} lc_{5.2} m_5 \dot{\theta}_2 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + a_3 lc_{5.2} lc_{5
   a_2 \ln 1_{5,1} + m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_2 \ln 1_{5,1} + m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_3 \ln 1_{5,1} + m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_2 \ln 1_{5,1} + a_3 \ln 1_{5,1} + a_5 \ln
   a_3 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - a_3 \log_{11} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_
   0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(2.0 
   0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0
   0.5 a_5 \ln_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + a_2 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 \ln_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) 
   a_3 \ln c_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_4 \ln c_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \cos(\theta_5) -
   0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_2) - 0.5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos
   0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
   0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_
   0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
   0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) +
   0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(2.0 
   0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, 
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.
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   0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.
   0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)
   0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5
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   0.5 a_5 \log_{10} a_5 \log
   a_1 \ln \ln a_1 \ln a_2 \ln a_3 \ln a_4 \ln a_5 \ln a_
   0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 
   0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta
   0.5 a_5 \ln 2 a_5 \ln 3 a_5 \ln 3
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0.5 a_5 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
   a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(
   a_2 \ln 1_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 a_5 \ln 1_{5,3} m_5 \dot
   0.5 a_5 \log_3 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 \cos(\theta_5) \sin(\theta_5) \sin(
   0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5)
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,2} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,2} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,2} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2) + lc_{5,2} lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5
   lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3)
   lc_{5,1} lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(
   a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_
   a_2 \ln 1 = a_2 
   lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) sin(\theta_4) sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_4) sin(\theta_3) sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_4) sin(\theta_4) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_4) sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 cos(\theta_4) sin(\theta_5) - lc_{5,2} lc_{5,3} cos(\theta_5) sin(\theta_4) - lc_{5,2} lc_{5,3} cos(\theta_5) sin(\theta_5) - lc_{5,2} lc_{5,3} cos(\theta_5) sin(\theta_5)
   a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
   a_2 \ln a_2 \ln a_3 \ln a_4 \ln a_5 
   lc_{5,1}lc_{5,3}m_5\dot{\theta}_2\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_2)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2
   0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.
   0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) \, d\phi
   0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) \, \dot{\theta}_5 \, \dot{\theta}_6 
   0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, d\phi_5 \, d\phi_5 \, d\phi_6 \, d\phi_6
   0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \cos(2.0 \, \theta_4) \cos(\theta_2) \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_2) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_5) \cos(2.0 \, \theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_5) \cos(2.0 \, \theta_5) + 0.25 \, \dot{\theta}_5 \cos(2.0 \, \theta_5) \cos(2.0
   0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_
   a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_2) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) \sin(\theta_5) + a_4 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_
   a_4 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + a_4 lc_{5,1} m
   a_4 \ln a_5 \ln a_5 + a_4 \cos (2.0 \theta_4) \sin (2.0 \theta_3) \cos (\theta_2) \cos (\theta_5) + 0.5 a_4 \ln a_5 \ln a_5 \cos (2.0 \theta_3) \cos (2.0 \theta_4) \cos (\theta_2) \sin (\theta_5) + 0.5 \ln a_5 \ln a_5 \cos (2.0 \theta_4) \cos (2.0 \theta_5) \cos (2.0
   0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + 0.5 a_5 lc_{5,1} m_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + 0.5 a_5 lc_{5,1} m_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + 0.5 a_5 lc_{5,1}
   0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)
   0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta
   0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(
   a_4 \ln a_5 = a_5 \ln a_5 + a_5 
   a_4 \ln \log a_5 = 
   a_4 \log_{10} a_4 \log_{10
   0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
   0.5 a_4 \ln c_5 = m_5 \dot{\theta}_5 \sin (2.0 \theta_3) \sin (2.0 \theta_4) \cos (\theta_2) \cos (\theta_5) - 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos (2.0 \theta_3) \sin (2.0 \theta_4) \sin (\theta_2) \sin (\theta_5) - 0.5 a_4 \ln c_5 = m_5 \dot{\theta}_5 \sin (2.0 \theta_4) \sin (2.0 \theta_4) \sin (2.0 \theta_5) \cos (2.0 \theta_5) \sin (2.0 \theta_5)
   0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \sin(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \dot{\theta}_3
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0.5\,a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_2)}\,\sin{(\theta_4)}\,\sin{(\theta_5)} - 0.5\,a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.5\,a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_5)}\,\sin{(\theta_4)} - a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(\theta_5)}\,- a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} - a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} - a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} - a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} - a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(\theta_5)} - a_5\,a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_5\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} - a_5\,a_5\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_5)} - a_5\,a_5\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_5)} - a_5\,a_5\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_5)} - a_5\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_5)} - a_5\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)
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C_{13} = 0.5 I_{\text{xv},3} \dot{\theta}_1 \cos(2.0 \,\theta_3) + 0.25 I_{\text{xx},3} \dot{\theta}_1 \sin(2.0 \,\theta_3) - 0.25 I_{\text{vv},3} \dot{\theta}_1 \sin(2.0 \,\theta_3) - 0.5 I_{\text{zz},3} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{\text{zz},4} \dot{\theta}_2 \cos(\theta_2) - 0.
0.5 I_{zz,5} \dot{\theta}_2 \cos(\theta_2) + 0.5 I_{xx,3} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) + 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 I_{xx,3} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) + 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 I_{xx,3} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(
0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.25 I_{yy,3} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) - 0.25 I_{yy,3} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) - 0.25 I_{yy,3} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_3) - 0.25 I_{yy,3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 
0.25 I_{vv,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{vv,4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.5 I_{xv,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.5 I_{xx,3} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.5 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_4) + 0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_4) + 0.5 I_
0.5 I_{\text{vv},3} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(\theta_2)} - I_{\text{xv},3} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \cos{(\theta_2)} + 0.5 I_{\text{xz},3} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_3)} - 0.0625 a_3^2 m_3 \dot{\theta}_1 \sin{(2.0\,\theta_3)} - 0.0625 a_3^2 m_3 \dot{\theta}_2 \sin{(2.0\,\theta_3)} - 0.0625 a_3^2 m_3 \dot{\theta}_3 \sin{(2.0\,\theta_3)
0.25 a_3^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) - 0.25 a_3^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) - 0.5 I_{vz,3} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) - 0.25 lc_{3,1}^2 m_3 \dot{\theta}_1 \sin(2.0 \theta_3) + 0.25 lc_{3,1}^2 m_3 \dot{\theta}_1 \sin(2.0 \phi_3) + 0.25 lc_{3,1}^
0.25 \log_{3.2}^2 m_3 \dot{\theta}_1 \sin(2.0 \theta_3) - I_{xz,3} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) - 0.125 a_3^2 m_3 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_3^2 m_4 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_3^2 m_5 \dot{\theta}_2 
0.125\,a_4^2\,m_4\,\dot{\theta}_2\,\cos{(\theta_2)} - 0.5\,a_4^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_2)} - 0.125\,a_5^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_2)} + I_{\text{vz.}3}\,\dot{\theta}_3\,\cos{(\theta_2)}\,\sin{(\theta_3)} - 0.5\,\text{lc}_{3.1}^2\,m_3\,\dot{\theta}_2\,\cos{(\theta_2)} - 0.125\,a_5^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_2)} + I_{\text{vz.}3}\,\dot{\theta}_3\,\cos{(\theta_2)} + I_{\text{vz.}3}\,\dot
0.5 \log_{12}{}^2 m_3 \dot{\theta}_2 \cos{(\theta_2)} - 0.5 \log_{12}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_2)} - 0.5 \log_{12}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_2)} - 0.5 \log_{12}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_2)} - 0.5 \log_{12
0.5 I_{xx,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.25 l_{3,1}^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \sin(2.0 \theta_4) \cos(\theta_4) \cos
0.25 \log_{3.2}{}^2 m_3 \dot{\theta}_1 \cos{(2.0 \theta_2)} \sin{(2.0 \theta_3)} - 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_4)} - 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_3)} \sin{(2.0 \theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta
0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.125 a_3^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.125 a_3^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2) - 0.125 a_3^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_2) - 0.125 a_3^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_
0.5 a_3^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 a_3^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 I_{xz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) -
0.5 \log_{3} \frac{1}{2} m_3 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + 0.5 \log_{3} \frac{2}{2} m_3 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} - 0.5 I_{vz,4} \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} - 0.5 \log_{3} \frac{2}{2} m_3 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + 0.5 \log_{3} \frac{2}{2} m_3 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + 0.5 \log_{3} \frac{2}{2} m_3 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + 0.5 \log_{3} \frac{2}{2} m_3 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + 0.5 \log_{3} \frac{2}{2} m_3 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + 0.5 \log_{3} \frac{2}{2} \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3
0.5 I_{\text{vz},4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_3)} - 0.5 I_{\text{xz},4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} + 0.5 I_{\text{xv},4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.5 I_{\text{xz},4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} + 0.5 I_{\text{xv},4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.5 I_{\text{xz},4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} + 0.5 I_{\text{xz},4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.5 I_{\text{xz},4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} + 0.5 I_{\text{xz},4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.5 I_{\text{xz},4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} + 0.5 I_{\text{xz},4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.5 I_{\text{xz},4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} 
0.5 I_{xv.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 a_3 \log_{3.2} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) - 0.5 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) + 0.5 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2
0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{xx,6} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{xx,6} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 
0.25 I_{xx.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.25 I_{xx.5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.25 I_{yy.4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{xx.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2
0.25 I_{vv,4} \dot{\theta}_1 \cos{(2.0 \theta_2)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_3)} + 0.25 I_{vv,5} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} + 0.25 I_{vv,5} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} + 0.25 I_{vv,5} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} + 0.25 I_{vv,5} \dot{\theta}_1 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \sin{(2.0 \theta_5)} + 0.25 I_{vv,5} \dot{\theta}_1 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \sin{(2.0 \theta_5)} + 0.25 I_{vv,5} \dot{\theta}_1 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(2.0 \theta_5)} \cos{(2
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.25 a_3 \ln_{3.1} m_3 \dot{\theta}_1 \sin{(2.0\,\theta_3)} - 0.5 I_{\text{xv},4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)} \cos{
0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
I_{xz,4}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\cos(\theta_4) - I_{xz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4) + 0.25I_{xx,5}\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) - 0.000
0.25 I_{\text{vv},5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + I_{\text{vz},4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + I_{\text{vz},4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + I_{\text{vz},4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + I_{\text{vz},4} \dot{\theta}_4 \sin(\theta_4) + I_{\text{vz},4}
I_{vz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)+I_{vz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)+I_{xz,4}\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_4)
0.25 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_1 \, \cos{(\theta_3)} + 0.5 \, a_1 \, a_3 \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} + a_1 \, a_3 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} + a_1 \, a_3 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} + a_1 \, a_3 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_3 \, a_3 \, a_3 \, \dot{\theta}_3 \, \dot{\theta}_3
a_1 a_3 m_5 \dot{\theta}_3 \cos(\theta_3) + 0.5 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_2 \log_{10} m_3 \dot{\theta}_1 \cos(\theta_3) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 i_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_4)
a_1 \log_{3.1} m_3 \dot{\theta}_3 \cos(\theta_3) - 0.5 a_3 \log_{3.1} m_3 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_5 \log_{5.1} m_5 \dot{\theta}_2 \cos(\theta_2) - I_{xv,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{xv,4} \dot{\theta}_3 \cos(\theta_3) - I_{xv,4
I_{xy,4} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} - 0.5\,a_2 \,lc_{3,2} \,m_3 \,\dot{\theta}_1 \sin{(\theta_3)} - a_1 \,lc_{3,2} \,m_3 \,\dot{\theta}_3 \sin{(\theta_3)} - 0.0625\,a_3^2 \,m_3 \,\dot{\theta}_1 \cos{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} - 0.0625\,a_3^2 \,m_3 \,\dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} - 0.0625\,a_3^2 \,m_3 \,\dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} - 0.0625\,a_3^2 \,m_3 \,\dot{\theta}_3 \sin{(\theta_3)} - 0.0625\,a_3^2 \,m_3^2 \,\dot{\theta}_3 \cos{
0.25 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) - 0.25 a_3^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_4)
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \sin{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 
0.5 \, \text{lc}_{3.1} \, \text{lc}_{3.2} \, m_3 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} - 0.5 \, \text{lc}_{4.1} \, \text{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} - 0.25 \, I_{\text{xx}, 5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, I_{\text{xx}, 5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, I_{\text{xx}, 5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, 
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
0.25\,I_{\mathrm{yy},5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{2})}\,\cos{(2.0\,\theta_{4})}\,\cos{(2.0\,\theta_{5})}\,\sin{(2.0\,\theta_{3})} - 0.25\,a_{3}\,\mathrm{lc}_{3,1}\,m_{3}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{2})}\,\sin{(2.0\,\theta_{3})} - 0.25\,a_{4}\,\mathrm{lc}_{4,1}\,m_{4}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})} - 0.25\,a_{5}\,\mathrm{lc}_{3,1}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{2})}\,\sin{(2.0\,\theta_{3})} - 0.25\,a_{5}\,\mathrm{lc}_{3,1}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{3})} - 0.25\,a_{5}\,\mathrm{lc}_{3,1}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{3})} - 0.25\,a_{5}\,\mathrm{lc}_{3,1}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{3})} - 0.25\,a_{5}\,\mathrm{lc}_{3,1}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{3})} + 0.25\,a_{5}\,\mathrm{lc}_{3,1}\,m_{5}\,\dot{\theta}_{1}\,\dot{\theta}_{2}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_
0.25 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0
0.5 I_{\text{XV},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 a_4 l_{\text{C4},2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.5 l_{\text{C4},1} l_{\text{C4},2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)}
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0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5)
    0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_2 \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_3 \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_4 \sin(\theta_5) - 0.5 I_{\text{xz},5} \dot{\theta}_5 \sin(\theta_5) 
    0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_2 \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_3 \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_4 \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_5 \sin(\theta_5) + 0.5 I_{yz,5} \dot{
    0.5 I_{\text{vz},5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_2 a_3 m_3 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} - 0.5 a_2 a_3 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} - 0.5 a_2 a_3 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_2)} \cos
    0.5 a_2 a_3 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0
    0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{3,1} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) - 0.5 a_3 \log_{3,1} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(
0.5 \, a_3 \, \text{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, 
    0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 a_4 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(\theta_4) + I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(\theta_4) + I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(\theta_4) + I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_4) + I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_4) + I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_4) + I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.
    I_{xy,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) + I_{xy,5}\dot{\theta}_2\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\cos(\theta_2) + 0.5\,a_2\,l_{3,2}\,m_3\dot{\theta}_1\cos(2.0\,\theta_2)\sin(\theta_3) + 0.5\,a_2\,l_{3,2}\,m_3\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3
    0.5 a_3 \log_{12} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) - 0.25 a_3 \log_{13} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(
    0.5 a_3 \ln a_4 + m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) - 0.5 a_3 \ln a_4 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_3 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_3 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_3 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_2 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_2 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_2 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_2 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_2 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_2 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_2 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \ln a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_2) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_3) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_3) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_3) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_3) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_3) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_3) \cos (\theta_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \theta_3) \cos (2.0 \phi_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \phi_3) \cos (2.0 \phi_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \phi_3) \cos (2.0 \phi_3) \cos (2.0 \phi_3) - 0.5 a_5 \dot{\theta}_3 \sin (2.0 \phi_3) \cos (2.0 \phi
    0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, 
    0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)}
    0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} + \ln_{3,1} \ln_{3,2} \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - 0.5 \ln_{3,1} \ln_{3,3} \, m_3 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} + \ln_{3,1} \ln_{3,2} \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + \ln_{3,1} \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + \ln_{3,1} \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + \ln_{3,1} \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} + \ln_{3,2} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + \ln_{3
    0.5 I_{xx,5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{xx,5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{xx,5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)}
    0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5)
    I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_5 \cos(\theta_5) + I_{\text{vz
    0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) - 0.25 lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) - 0.25 lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \phi_4) \cos(2.0 \phi
    0.25 \log_{4,2}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} + 0.25 \log_{4,2}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{
    0.25 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.25 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)
    0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.5 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_
    I_{xy,5}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)+I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(2.0\,\theta_5)\sin(\theta_4)+I_{xz,5}\dot{\theta}_3\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta
    I_{xz,5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + I_{xz,5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + I_{xz,5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + I_{xz,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos
    I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)+I_{xz,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)
    I_{xz.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3) - 0.0625\,a_5^2\,m_5\,\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) - I_{yz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) - I_{yz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_3) - 0.0625\,a_5^2\,m_5\,\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) - I_{yz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) - I_{yz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_3) - 0.0625\,a_5^2\,m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) - I_{yz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) - I_{yz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_3) - I_{yz.5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) - I_{yz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_3) - I_{yz.5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_3) - I_{yz.5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\sin(\theta_3) - I_{yz.5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3) - I_{yz.5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)
    I_{vz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-I_{vz.5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{vz.5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)-I_{vz.5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)\sin(\theta_5)
    I_{\text{vz},5} \,\dot{\theta}_4 \,\cos\left(\theta_2\right) \,\cos\left(\theta_4\right) \,\sin\left(\theta_3\right) \,\sin\left(\theta_5\right) - I_{\text{vz},5} \,\dot{\theta}_4 \,\cos\left(\theta_2\right) \,\cos\left(\theta_5\right) \,\sin\left(\theta_3\right) \,\sin\left(\theta_4\right) - I_{\text{yz},5} \,\dot{\theta}_5 \,\cos\left(\theta_2\right) \,\cos\left(\theta_3\right) \,\sin\left(\theta_4\right) - I_{\text{yz},5} \,\dot{\theta}_5 \,\cos\left(\theta_2\right) \,\cos\left(\theta_3\right) \,\sin\left(\theta_4\right) - I_{\text{yz},5} \,\dot{\theta}_5 \,\cos\left(\theta_3\right) \,\cos\left(\theta_3\right) \,\cos\left(\theta_3\right) \,\sin\left(\theta_4\right) - I_{\text{yz},5} \,\dot{\theta}_5 \,\cos\left(\theta_3\right) \,\cos\left(\theta_4\right) \,\cos\left(\theta_4\right) \,\cos\left(\theta_5\right) - I_{\text{yz},5} \,\dot{\theta}_5 \,\cos\left(\theta_5\right) \,\cos\left(
    I_{vz.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5) - I_{vz.5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) - 0.25\log_{10}^2 m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.25\log_{10}^2 m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)
    0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - I_{xz,5} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{xz,5} \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{xz,5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{xz,5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{xz,5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_5) - I_{xz,5} \dot{\theta}_5 \cos(\theta_2) \sin(\theta_5) - I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(
    I_{xz.5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.25\,a_2\,a_4\,m_4\,\dot{\theta}_1\cos(\theta_3)\cos(\theta_4) + 0.5\,a_1\,a_4\,m_4\,\dot{\theta}_3\cos(\theta_3)\cos(\theta_4) + 0.5\,a_2\,a_4\,m_5\,\dot{\theta}_1\cos(\theta_3)\cos(\theta_4) - 0.5\,a_2\,a_3\,m_5\,\dot{\theta}_1\cos(\theta_3)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)
    0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) + 0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + a_1 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) - a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) + a_1 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) + a_2 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + a_4 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + a_5 \, a_5 \, a_5 \, \cos(\theta_4) \, \cos(\theta_4) + a_5 \, a_5 \, a_5 \, \cos(\theta_4) \, \cos(\theta_4) + a_5 \, a_5 \, a_5 \, \cos(\theta_4) \, \cos(\theta_4) + a_5 \, a
    a_1 a_4 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + 0.5 a_3 \log_{33} m_3 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) + 0.5 a_2 \log_{41} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) + a_1 \log_{41} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) - a_1 \log_{41} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) + a_2 \log_{41} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + a_3 \log_{41} m_4 \dot{\theta}_3 \cos(\theta_4) + a_4 \log_{41} m_4 \dot{\theta}_4 \cos(\theta_4) + a_4 \log_{41} m_
    a_3 \ln_{4.1} m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) + a_1 \ln_{4.1} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + a_3 \ln_{4.3} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) + a_3 \ln_{5.3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) + a_5 \ln_{5.3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) + a_5 \ln_{5.3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 \ln_{5.3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 \ln_{5.3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(
    a_4 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5) - 0.5 a_1 a_3 m_3 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) - a_1 a_3 m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) - a_1 a_3 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) - a_1 a_3 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) - a_1 a_3 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) - a_1 a_3 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(
    0.5 a_2 a_3 m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) - a_2 a_3 m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) - a_2 a_3 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_5) + 0.5 a_5 a_5 \cos(\theta_3) \sin(\theta_2) - a_5 a_5 \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3
    0.5 a_4 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) - 0.125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.
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lc_{3,1}lc_{3,3}m_3\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)-a_1lc_{3,1}m_3\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-0.5a_2lc_{4,2}m_4\dot{\theta}_1\cos(\theta_3)\sin(\theta_4)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-a_2lc_{3,1}m_3\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)
   0.5 a_2 \ln_{4,2} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) - a_1 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_1 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + a_3 \ln_{4,2} m_4 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) - a_1 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + a_2 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + a_3 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - a_1 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + a_3 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - a_1 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + a_2 \ln_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + a_3 \ln_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) + a
   a_1 \log_{12} m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - a_1 \log_{12} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) + a_3 \log_{12} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) + a_4 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_5) + a_4 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + a_4 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + a_4 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
   a_4 \ln a_5 
   0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - a_1 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - a_1 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, 
a_3 a_4 m_5 \dot{\theta}_4 \sin{(\theta_2)} \sin{(\theta_4)} - 0.5 \log_{4,1}{}^2 m_4 \dot{\theta}_2 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \cos{(\theta_2)} + 0.5 \log_{4,2}{}^2 m_4 \dot{\theta}_2 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \cos{(\theta_2)} - 0.5 \log_{4,2}{}^2 \cos{(2.0 \theta_4)} \cos{(\theta_2)} + 0.5 \log_{4,2}{}^2 \cos{(2.0 \theta_4)} \cos{(\theta_2)} + 0.5 \log_{4,2}{}^2 \cos{(2.0 \theta_4)} \cos{(\theta_2)} + 0.5 \log_{4,2}{}^2 \cos{(2.0 \theta_4)} \cos{(2.0 \theta_4)}
   lc_{3,2}lc_{3,3}m_3\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)+a_1lc_{3,2}m_3\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)+a_2lc_{3,2}m_3\dot{\theta}_3\sin(\theta_2)\sin(\theta_3)-0.5a_2lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)-0.5a_2lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)
   a_1 \log_{1.1} m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) - a_1 \log_{1.1} m_4 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) + a_3 \log_{1.1} m_4 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_4) - a_4 \log_{1.1} m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_5) + a_4 \log_{1.1} m_4 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + a_5 \log_{1.1} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + a_5 \log_{1.1} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{1.1} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5
   0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc_{4.1}}^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \,
   0.5 \log_{4.2}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 a_3 \log_{3.2} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) - 0.5 \log_{3.2} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3)
   0.25 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.0625 \, a_5^{\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^{\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^{\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^{\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0625 \, a_5^{\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^{\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^{\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.
   0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) + 0.25 \log_{
   0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_5 \, \dot{\theta}_4 \, \dot{\theta}_4 \, \dot{\theta}_5 \, \dot{\theta}_6 \, 
   a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.
   a_3 lc_{4,1} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_4) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_4) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_4) \cos(2.0 \theta_5) \cos(\theta_4) \cos(2.0 \theta_5) \cos(2.0 \theta_5
   0.5 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{
   a_3 \, \text{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0\,\theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} - 0.25 \, a_4 \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0\,\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} - 0.5 \, a_4 \, \text{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0\,\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta
   0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
   0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc_{5,2}}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc_{5,2}}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc_{5,2}}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc_{5,2}}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \,
   0.5 \operatorname{lc}_{4.1} \operatorname{lc}_{4.3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 a_2 \operatorname{lc}_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + a_3 \operatorname{lc}_{4.1} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + a_3 \operatorname{lc}_{4.1} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) + a_3 \operatorname{lc}_{4.1} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + a_3 \operatorname{lc}_{4.1} m_4 \dot{\theta}_4 \cos(2.0 
   0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 a_
   0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_
   0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.3} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.3} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.3} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.3} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.3} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.3} \, \mathrm{lc}_{4
   0.25 \, a_4 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} +
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.
   0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \cos(2.0 \theta
   0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
   0.5 \log_{4.1} \log_{4.3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 a_4 \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.25 a_5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 \log_{10} m_4 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(2.
   0.5 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.5 \, \text{lc}_{5 \, 1} \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} - 0.25 \, a_4 \, \text{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_4 \, \text{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_4 \, \text{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_4 \, \text{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
   0.25 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0
   0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2
   0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 a_4 \log_{10} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
   0.5 a_4 \log_4 a_5 = 0.5 \alpha_4 \log_4 a_5 = 0.5 \alpha_5 \log_5 a_5 = 0.5 \alpha_5 \log_
   a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_1 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_4 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) + a_4 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
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a_1 \log_{10} a_5 \log_{10} \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 \log_{10} a_5 \log_{10} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_1 a_4 m_4 \beta_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_1 a_2 m_4 \log_{10} \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_1 a_2 m_4 \log_{10} \cos(\theta_4) \cos(\theta_5) \cos(\theta_4) \cos(\theta_5) \cos
a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
a_2 a_4 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 a_4 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_5) - 0.25 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) \cos
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.00 \, a_1 \, a_2 \, a_3 \, a_4 \, a_5 \, a_4 \, a_5 \, a
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_5 
0.5 a_1 a_5 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.5 a_1 a_5 m_5 \theta_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_3 a_5 m_5 \theta_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_3 a_5 m_5 \theta_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) + \log_{1.1} \log_{1.2} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + \log_{1.1} \log_{1.2} m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - a_1 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 \log_{10} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) - a_1 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_5) 
a_2 \ln_{11} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 \ln_{11} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 \ln_{11} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) - 0.5 a_2 \ln_{11} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 \ln_{11} m_5 \dot{\theta}_1 \cos(\theta_4) - 0.5 
0.5 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d
a_1 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_3 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_
a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(
a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos
a_3 \operatorname{lc}_{51} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \operatorname{lc}_{51} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - \operatorname{lc}_{42} \operatorname{lc}_{43} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - \operatorname{lc}_{43} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
lc_{4,2}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)+lc_{4,2}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)+lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta
a_1 \ln a_2 + a_4 \ln a_1 + a_1 \ln a_2 + a_4 \ln a_1 + a_4 \ln a_2 + a_4 \ln a_2 + a_4 \ln a_1 + a_4 \ln a_2 + a_4 \ln a_2 + a_4 \ln a_2 + a_4 \ln a_1 + a_4 \ln a_2 + a_4 
a_2 \ln_{4.2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + a_2 \ln_{4.2} m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + a_2 \ln_{4.2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - a_2 \ln_{4.2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + a_2 \ln_{4.2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) \sin(\theta
0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
0.5 a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \cos(\theta_5) \cos
a_1 \ln c_2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_1 \ln c_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_3 \ln c_5 m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_5 \ln c_5 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + a_5 \ln c_5 m_5 \dot{\theta}_3 \cos(\theta_5) + a_5 \ln c
a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
a_4 \ln a_5 + a_5 
a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_3 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
a_4 \ln a_5 = a_5 
0.5 a_2 a_4 m_4 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 a_4 m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 a_4 m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_4 a_5 \dot{\theta}_5 \sin(\theta_4) \sin(\theta_5) \sin(
0.5 a_1 a_5 m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 a_5 m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 a_5 m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 a_5 \sin(\theta_5) \sin(\theta_5) - 0.5 a_5 \sin(\theta_5) \sin
lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_3)\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\sin(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\cos(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\cos(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\cos(\theta_4)+a_1lc_{4,1}m_4\dot{\theta}_1\cos
a_2 \ln_{4.1} m_4 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 \ln_{4.1} m_4 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \sin(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \sin(\theta_5) \sin(
a_1 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_1 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + a_1 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(
a_3 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - a_5 \log_{10} m_5 \dot{\theta}_2 \sin(\theta_4) \sin(\theta_5) - a_5 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_4) \sin(\theta_5) - a_5 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) - a_5 \log_{10} m_5 \dot{\theta}_5
0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_
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0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \dot{\theta}_3 \, \dot{\theta}_
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc_{4.1}} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
0.5 a_4 \ln a_2 \cos (2.0 \theta_3) \sin (2.0 \theta_4) \cos (\theta_2) + 0.5 a_4 \ln a_2 \cos (2.0 \theta_4) \sin (2.0 \theta_3) \cos (\theta_2) + 0.5 a_4 \ln a_2 \cos (2.0 \theta_4) \sin (2.0 \theta_3) \cos (2.0 \theta_4) \sin (2.0 \theta_3) \cos (2.0 \theta_4) \sin 
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta
lc_{4,1}lc_{4,2}m_4\dot{\theta}_2\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_2\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) + 0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\cos(2.0\,\theta_2)\sin(2.0\,\theta_3)\sin(\theta_4) + 0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_2\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta
0.5 \, a_4 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 
0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.25 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) + 0.25 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_4)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} - 0.25 \log_{5,1}{}^2 \sin{(2.0 \,\theta_3)} \cos{(2.0 
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_4) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 0.25 a_5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) + 0.25 a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) + 0.25 a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.25 \alpha_5 
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.00 \, \sin(\theta_5) \, \cos(\theta_5) \, \cos
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} - 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.5 \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_5) \cos(
0.5 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5
a_3 \ln_{10} \ln_{10} \frac{1}{10} \ln
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_5 
a_3 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_3 \sin(\theta_5) - a_3 \log_
0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.25 a_5 lc_{5,3}
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, lc_{5.1} \, lc_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, lc_{5.1} \, lc_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, lc_{5.1} \, lc_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, lc_{5.1} \, lc_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, lc_{5.1} \, lc_{5.3} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, d\phi_4 \, \sin(\theta_5) \, d\phi_5 \, d\phi_6 \,
0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 \log_{1.1} \log_{1.1} \log_{1.1} \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 \log_{1.1} \log_{1.1} \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 \log_{1.1} \log_{1.1} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2
0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_3 \sin(\theta_5) 
0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4 \log_1 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) +
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.05 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.05 a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.00 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.00 a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.5 \log_{10} \log_{
0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 
0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) - 0.00 \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_4) \, \cos(2.0 \, \theta_4) \, \cos
lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_5)\cos(\theta_5) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos
lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\cos(\theta_2) + 0.5\,a_4\,lc_{5,1}m_5\dot{\theta}_1\cos(2.0\,\theta_2)\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(\theta_5) + 0.5\,a_4\,lc_{5,1}m_5\dot{\theta}_1\cos(2.0\,\theta_2)\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(\theta_5) + 0.5\,a_4\,lc_{5,1}m_5\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(\theta_5) + 0.5\,a_4\,lc_{5,1}m_5\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2
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0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2
0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_
0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos (2.0 \, \theta_5) \, \sin (2.0 \, \theta_4) \, \cos (\theta_2) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos (\theta_2) \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_2) \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos (\theta_5) \, - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot
lc_{5,2}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) - 0.5a_4lc_{5,2}m_5\dot{\theta}_1\cos(2.0\theta_2)\sin(2.0\theta_3)\sin(2.0\theta_4)\sin(\theta_5) + 0.5a_5lc_{5,2}m_5\dot{\theta}_2\sin(2.0\theta_3)\sin(2.0\theta_4)\sin(2.0\theta_5)\cos(\theta_2) + 0.5a_5lc_{5,2}m_5\dot{\theta}_2\sin(2.0\theta_3)\sin(2.0\theta_4)\sin(2.0\theta_5)\cos(\theta_2)\cos(\theta_3)\sin(2.0\theta_4)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2.0\theta_5)\sin(2
a_1 \ln \log m_5 = m_5 + \log m_5 = m_5 + \log m_5 = \log 
a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 
0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, a_3 \, a_4 \, a_5 \, a_5 \, a_4 \, a_5 \, a_5 \, a_4 \, a_5 \,
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} \, \cos{(\theta_2)} 
0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + \text{lc}_{5,1} \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - \text{lc}_{5,1} \, \text{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - \text{lc}_{5,1} \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - \text{lc}_{5,1} \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5)
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) 
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_3 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_3 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
a_2 \ln 1 + a_2 \ln 1 + a_3 \ln 1 + a_4 \ln 1 + a_5 
a_2 \ln 1 + a_2 \ln 1 + a_3 \ln 1 + a_4 \ln 1 + a_4 \ln 1 + a_5 
a_2 \ln 1 + m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_2 \ln 1 + a_5 \ln 1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + \ln 1 \cos(\theta_5) \sin(\theta_5) \sin(
lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\sin(\theta_4) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_3)\sin(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)
lc_{5,2}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5) + lc_{5,2}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) - a_1lc_{5,2}m_5\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5) - a_1lc_{5,2}m_5\dot{\theta}_1\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)
a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
a_2 \operatorname{lc}_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_2 \operatorname{lc}_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 \operatorname{lc}_{5,2} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_2 \operatorname{lc}_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_3 \operatorname{lc}_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \operatorname{lc}_{5,2} m_5 \dot{\theta}
a_2 \ln c_{5,2} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_2 \ln c_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 \ln c_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_2 \ln c_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_3 \ln c_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_3 \ln c_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)
a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5
0.5 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \cos(\theta
0.5 a_2 a_5 m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + a_4 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + a_4 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + a_4 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + a_4 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta
a_1 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) \sin
a_2 \ln a_5 
0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) 
0.5 a_3 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos
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0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + \\
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + \\
0.5 \, a_3 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - \\
a_4 \, l_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) - a_4 \, l_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_5) - a_4 \, l_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) - \\
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \\
a_4 \, l_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_5 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) + \\
0.5 \, l_{5,1} \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) + 0.25 \, a_5 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) + \\
0.25 \, a_5 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_4) + 0.25 \, a_5 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) + \\
0.25 \, a_5 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_4) + 0.25 \, a_5 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3
```

```
C_{14} = 0.25 I_{xy,4} \dot{\theta}_1 + 0.25 I_{xy,5} \dot{\theta}_1 + 0.5 I_{xy,4} \dot{\theta}_1 \cos(\theta_2)^2 - 0.5 I_{xy,4} \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_2 \cos(\theta_2)^2 + 0.5 I
0.5 I_{xv,4} \dot{\theta}_1 \cos(\theta_4)^2 - 0.5 I_{xv,5} \dot{\theta}_1 \cos(\theta_3)^2 - 0.5 I_{xv,5} \dot{\theta}_1 \cos(\theta_4)^2 - 0.5 I_{xv,5} \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 I_{zz,4} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{zz,4} \dot{\theta}_2 \cos(\theta_3)^2 - 0.5 I_{zz,5} \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 I_{zz,5} \dot{\theta}_2 \cos(\theta_5)^2 - 0.5 I_{zz,5} \dot{\theta}_3 \cos(\theta_5)^2 - 
0.5 I_{zz,5} \dot{\theta}_2 \cos{(\theta_2)} - 0.25 I_{xy,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.125 a_4 \lg_{4,2} m_4 \dot{\theta}_1 - 0.125 a_5 \lg_{5,2} m_5 \dot{\theta}_1 - 0.25 \lg_{4,1} \lg_{4,2} m_4 \dot{\theta}_1 - 0.125 a_5 \lg_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_2)} - 0.25 \lg_{5,2} m_5 \dot{\theta}_1 - 0.25 \lg_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_2)} - 0.25 \lg_{5,2} m_5 
0.25 \log_{10} \log_
0.125 I_{\text{vv},4} \dot{\theta}_1 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_3) + 0.25 I_{\text{xv},4} \dot{\theta}_1 \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_4) - I_{\text{xv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{\text{xv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 - I_{\text{xv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + I_{\text{xv},4} \dot{\theta}_1 \cos(\theta_3)^2 + I_{\text{xv},4} \dot{\theta}_2 \cos(\theta_3)^2 + I_{\text{xv},4} \dot{\theta}_2 \cos(\theta_3)^2 + I_{\text{xv},4} \dot{\theta}_2 \cos(\theta_3)^2 + I_{\text{xv},4} \dot{\theta}_3 \cos(\theta_3)^2 + I_{\text{xv}
I_{\text{xv}} = \frac{1}{2} \frac{1}{2} \cos(\theta_2)^2 \cos(\theta_3)^2 + I_{\text{xv}} + \frac{1}{2} \cos(\theta_3)^2 \cos(\theta_4)^2 - I_{\text{xv}} + \frac{1}{2} \sin(\theta_2)^2 \cos(\theta_4)^2 - I_{\text{xy}} + \frac{1}{2} \sin(\theta_2)^2 \cos(\theta_3)^2 + I_{\text{xv}} + \frac{1}{2} \sin(\theta_2)^2 \cos(\theta_3)^2 + I_{\text{xv}} + \frac{1}{2} \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 + I_{\text{xv}} + \frac{1}{2} \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 + I_{\text{xv}} + \frac{1}{2} \sin(\theta_3)^2 + I_{\text{xv}} 
I_{xy.5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_4)^2 + I_{xy.5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_5)^2 + I_{xy.5}\dot{\theta}_1\cos(\theta_4)^2\cos(\theta_5)^2 - 0.125a_4^2m_4\dot{\theta}_2\cos(\theta_2) - 0.125a_4^2m_4\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(
0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) + 0.25 I_{xx} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx} \dot{\theta}_2 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx} \dot{\theta}_2 \cos(\theta_2) + 0.25 I_{xx}
0.25\,I_{\text{xx},4}\,\dot{\theta}_1\,\cos{(\theta_3)}\,\sin{(\theta_3)} - 0.25\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(\theta_3)}\,\sin{(\theta_3)} - 0.25\,I_{\text{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\sin{(\theta_4)} - 0.25\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\sin{(\theta_4)} - 0.25\,I_{\text{xx},5}\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} - 0.25\,I_{\text{xx},5}\,\dot{\theta
0.25 I_{xx} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{yy} = \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy} = \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{yy} = \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 I_{yy} = \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 I_{yy} = \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 I_{yy} = \dot{\theta}_2 \cos(\theta_
0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{\text{yy},4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{yy},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{yy},5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{\text{yy},5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25
0.5 \log_{4.1}^{2} m_{4} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{4.2}^{2} m_{4} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \cos(\theta_{2}) + 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) + 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) + 0.5 \log_{4.2}^{2} m_{5} \dot{\theta}_{2} \sin(\theta_{2}) + 0.
0.5 I_{\text{vv},4} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.125 \log_{4,1}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,1}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} - 0.125 \log_{4,1}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,1}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,1}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta
0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_3)^2 \sin(\theta_3) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) \cos(\theta_3)^2 \cos(\theta_3)^
0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) - 0.5 I_{xx,5}
0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos
0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \sin(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_6) \cos(\theta_6
0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
0.5 I_{xx,5} \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 I_{xx,5} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{xx,5} \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 0.5 I_{xx,5} \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 0.5 I_{xx,5} \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{xx,5} \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{xx,5} \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} + 
0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{yy} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{yy} = \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_5) + 0.5 I_{yy} = \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3)
0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3) 
0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(
0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{\text{vv.}5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{\text{vv.}5} \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{\text{vv.}5} \dot{\theta}_5 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{\text{vv.}5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) 
0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_5) + 0.5 I_{yy,5} \dot
0.5 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xy}} = \dot{\theta}_3 \cos(\theta_5) + 
0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 - 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 \log_4 \log_4 \theta_1 \cos(\theta_2)^2 + 0.25 \log_4 \theta_2 \cos(\theta_3)^2 + 0.25 \log_4 \theta_3 \cos(\theta_3)^2 + 0.25 \log_5 \cos(\theta_3)^2 + 0.25 \log_5 \theta_3 \cos(\theta_3)^
0.5 \, \text{lc}_{4\,1} \, \text{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{4\,1} \, \text{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 - 0.5 \, \text{lc}_{5\,1} \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 + 0.5 \, \text{lc}_{5\,1} \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc
0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4)^2 + 0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0\theta_3) \sin(2.0\theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0\theta_4) \sin(2.0\theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0\theta_4) \sin(2.0\theta_4) \sin
0.25 I_{\text{vv},4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.5 I_{\text{xz},4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) - 0.25 I_{\text{vv},4} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) + 0.25 I_{\text{vv},4} \dot{\theta}_4 \cos(\theta_4
0.5 I_{xx,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 I_{yz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 I_{yz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 I_{yz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 I_{yz,4} \dot{\theta}_1 \sin(\theta_4) - 0.5 I_{yz,4} \dot{\theta}_2 \sin(\theta_4) - 0.5 I_{yz,4} \dot{\theta}_1 \sin(\theta_4) - 0.5 I_{yz,4} \dot{\theta}_2 \sin(\theta_4) - 0.5 I_{yz,4} \dot{\theta}_3 \sin(\theta_4) - 0.5 I_{yz,4} \dot{\theta}_4 \sin(\theta
0.5 I_{xz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.125 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) + 0.125 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta
0.125 I_{xx.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.125 I_{xx.5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.125 I_{yy.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{yy.5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} 
0.125 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.125 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.25 I_{\text{xv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{
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0.25 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - I_{xz,4} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.25 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
I_{xz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4) - 0.125I_{xx,5}\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.125I_{yy,5}\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.125I_{yy,5}\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.125I_{yy,5}\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_5) + 0.125I_{yy,5}\dot{\theta}_1\sin(2.0\,\theta_5) + 0.125I_{yy,5}
I_{vz,4}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)+I_{vz,4}\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)+I_{vz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)+I_{vz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)-I_{vz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)+I_{vz,4}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos
0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3
2.0\,I_{\text{xy},5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{3})^{2}}\cos{(\theta_{4})^{2}}+2.0\,I_{\text{xy},5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{3})^{2}}\cos{(\theta_{5})^{2}}+2.0\,I_{\text{xy},5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{4})^{2}}\cos{(\theta_{5})^{2}}-10\,I_{\text{xy},5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{3})^{2}}\cos{(\theta_{3})^{2}}\cos{(\theta_{5})^{2}}
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + I_{xz,4} \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + I_{xz,4} \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \cos(\theta_4) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(\theta_4) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(\theta_4) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_4 \cos(\theta_4
0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_4
0.25 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{4}) \sin (\theta_{4}) - 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \sin (\theta_{2}) + 0.25 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) - 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.25
0.25 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.25 \log_{5} 1^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{4}) \sin(\theta_{4}) - 0.25 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{4}) \sin(\theta_{4}) + 0.25 \log_{5} 1^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) - 0.25 \log_{5} 1^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) + 0.25 \log_{5} 1^{2}
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_
0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.75 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.375 \, a_5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} + 0.375 \, a_5 \, a
0.75 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(\theta_4) - I_{xy,4} \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) - I_{xy,4} \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) - I_{xy,4} \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, d_3
0.75 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^2 \, m_4^2 \, \dot{\theta}_3 \, \cos{(2.0 
0.125 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.000 \, \sin{(\theta_4)} + 0.000 \,
0.0625\,a_3\,a_4\,m_4\,\dot{\theta}_1\,\cos{(\theta_4)}\sin{(2.0\,\theta_2)} + 0.125\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(\theta_4)}\sin{(2.0\,\theta_2)} + 0.125\,a_3\,a_4\,m_5\,\dot{\theta}_1\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,m_5\,\dot{\theta}_1\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,m_5\,\dot{\theta}_1\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,m_5\,\dot{\theta}_1\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,m_5\,\dot{\theta}_1\cos{(\theta_4)}\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,a_5\,\dot{\theta}_1\cos{(\theta_4)}\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,a_5\,\dot{\theta}_1\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,a_5\,\dot{\theta}_1\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\sin{(\theta_4)} - 0.125\,a_3\,a_4\,a_5\,\dot{\theta}_1\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(\theta_4)}\cos{(
0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{2}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{4})^{2} \sin (\theta_{2}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} \sin (\theta_{3})^{2} \sin (\theta_{3})^{2} \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4.1}^{2} \sin (\theta_{3})^{2} \sin (\theta_
0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{2}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{4})^{2} \sin (\theta_{2}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta
0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}{}^2 \, \sin{(\theta_3)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_4
0.5 \operatorname{lc}_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 \operatorname{lc}_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \operatorname{lc}_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 \operatorname{lc}_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_4) + 0.5 \operatorname{lc}_{4,2}
0.5 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) + 0.5 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{10} 2 \cos(\theta_3) \sin(\theta_3) \cos(\theta_4) \cos(\theta_4)
0.5 \log_{12}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{11}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \log_{12}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.5 \log_{12}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.5 \log_{12}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)}^2 \sin{(\theta_4)} - 0.5 \log_{12}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_4)}
0.5 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) - 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \cos (\theta_{4})^{2} \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{4}) \sin (\theta_{4}) - 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \sin (\theta_{3}) + 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{3} \sin (\theta_{3}) + 0.5 \log_{5.1}^
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_5)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_5)} + 0.5 \log_{
0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} +
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.5 \log_{5,1}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_4)} \cos{(\theta_5)} \cos{
0.5 \log_{10}^{2} m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{10}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{10}^{2} m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} 
0.5 \log_{2} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) + 0.5 \log_{2} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + 0.5 \log_{2} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + 0.5 \log_{2} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + 0.5 \log_{2} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} \sin(\theta_{5})^{2} \sin
0.25 \log_{4} \log_{2} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) - 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(\theta_{4}) \sin(2.0 \theta_{2}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \sin(\theta_{4}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \theta_{2}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \phi_{2}) + 0.125 a_{3} \log_{4} m_{4} \dot{\theta}_{1} \cos(2.0 \phi_{2}) + 0.125 a_{3} \log_{4
0.125 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.125 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.125 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.125 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.125 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)}
0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \cos(\theta_5) - 0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.125 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)^2} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2
0.25 a_4^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_3 \sin(\theta_5) - 0
0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \sin(2.0\theta_4) \cos(\theta_2)^2 - 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \cos(\theta_2)^2 + 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \sin(2.0\theta_4) \cos(\theta_2)^2 + 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \sin(2.0\theta_4) \cos(\theta_2)^2 + 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \sin(2.0\theta_3) \cos(\theta_2)^2 + 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \cos(\theta_2)^2 + 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \sin(2.0\theta_3) \cos(\theta_2)^2 + 0.25 lc_4 \frac{2}{1} m_4 \dot{\theta}_1 \cos(2.0\theta_3) \cos(\theta_2) \cos(\theta_
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0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 + I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) + I_{xx,4} \sin(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \cos(\theta_3)^2 \cos(\theta
I_{xx,4}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_2)+I_{xx,4}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\sin(\theta_4)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)^2\sin(\theta_4)
I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(
I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_5)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_4)\sin(\theta_4)-I_{xx,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos
I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5)-I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5)
I_{\text{xx},5} \,\dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_4\right) - I_{\text{xx},5} \,\dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right)^2 \sin \left(\theta_2\right) - I_{\text{vv},5} \,\dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_4\right) - I_{\text{xx},5} \,\dot{\theta}_1 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_1 \cos \left(\theta_5\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_3 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_2 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_3 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_3 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_3 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_3 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_3 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv},4} \,\dot{\theta}_5 \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) - I_{\text{vv}
I_{\text{vv},4} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} - I_{\text{vv},5} \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} - I_{\text{vv},4} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - I_{\text{vv},5} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} - I_{\text{vv},6} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} - I_{\text{vv},6} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} - I_{\text{vv},6} \, \dot{\theta}_2 \cos{(\theta_4)^2} 
I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) - I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) - I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) - I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 
I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv.5}} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv.5}} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv.5}} \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv.5}} \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv.5}} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)
I_{\text{vv},5} \,\dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - I_{\text{vv},5} \,\dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} - I_{\text{vv},5} \,\dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + I_{\text{vv},5} \,\dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + I_{\text{vv},5} \,\dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + I_{\text{vv},5} \,\dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_
I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0\,\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0\,\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_3 \sin(\theta_5) + 0.5 I_{\text{vz},5}
0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.125 a_3 a_4 m_4 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_2) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.125 a_3 a_4 m_4 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_2) + 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.125 a_3 a_4 m_4 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_3 \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_4 \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_4 \sin(\theta_5) + 0.5 I_{yz,5} \dot{\theta}_5 \dot{\theta}
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_2) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \cos(\theta_2) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \cos(\theta_2) + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_2) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \cos(\theta
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_2)} - 0.5 \, I_{\text{XX},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{VV},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \,
0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_3 lc_{4,1} m_4 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_2) + 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_3 \cos(\theta_4) \cos
0.125 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_2)} + 0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.0625 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0625 \, a_5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0625 \, a_5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0625 \, a_5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \,
0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) - 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.000 \, a_4 \, m_4 \, \dot{\theta}_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.000 \, a_4 \, \dot{\theta}_4 \, \dot{\theta}_
0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_5 \, a_4 \, a_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_5 \, a_4 \, a_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_5 \, a_4 \, a_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_5 \,
0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \cos{(\theta_4)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + I_{xy,5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + I_{xy,5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \,
I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) - 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) - 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_3 lc
0.25 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, d_3 \, \sin{(\theta_2)} 
0.25 a_3 lc_{4,2} m_4 \dot{\theta}_2 \sin(\theta_4) \cos(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(\theta_4) \cos(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(\theta_4) \cos(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(\theta_4) \cos(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(\theta_4) \cos(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4
0.5 a_3 \log_4 2 m_4 \dot{\theta}_4 \sin(\theta_4) \cos(\theta_2) - 0.5 a_4 \log_1 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_2) + 0.5 a_4 \log_1 m_5 \dot{\theta}_2 \sin(\theta_5) \cos(\theta_2) + 0.5 a_4 \log_1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) - 0.5 a_4 \log_1 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \,
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} \, \sin{(\theta_2)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} - 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} 
0.5 I_{\text{XX},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{\text{XX},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
0.5 I_{xx.5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy.5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy.5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy.5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy.5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2
    I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_5 \cos(
0.5 a_4 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 a_4 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 - 0.5 a_4 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_4 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_4)^2 + 0.5 a_
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5)^2 - 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 \log_{
0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 - 0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 - 0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5)^2 - 0.5 \log_2 m_5 \dot{\theta}_3 \cos(
0.25 a_3 lc_{4,1} m_4 \dot{\theta}_2 \sin(\theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_3 \sin(\theta_4) \sin(\theta_2) - 0.125 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_4) + 0.00 column
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0.5 a_3 \ln a_4 \ln a_4 + \ln a_4 \ln a_5 \ln a_4 \ln a_4 \ln a_5 
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \sin{(\theta_2)} - 0.125 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.125 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} - 0.125 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} - 0.125 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} 
0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{4})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{3})} + 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{4})} \sin{(2.0 \,\theta_{5})} + 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} + 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} + 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.
0.125 \log_{2} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{3}) + \log_{4} 1 \log_{4} 2 m_{4} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} + \log_{4} 1 \log_{4} 2 m_{4} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{4})^{2} - \log_{4} 2 \log(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{3}) + \log_{4} 2 \log(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(\theta_{5}) \cos(
lc_{4,1}lc_{4,2}m_4\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_4)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_4)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2 + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)^2 + lc_{5,1}
lc_{5.1} lc_{5.2} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - lc_{5.1} lc_{5.2} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)^2} - lc_{5.1} lc_{5.2} m_5 \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_5)^2} - I_{xy,5} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + I_{xy,5} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_5)^2} - I_{xy,5} \dot{\theta}_2 \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_5)^2} + I_{xy,5} \dot{\theta}_3 
I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)+I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)
I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)+I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)
I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_5)
0.03125 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) + I_{xy,6} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + I_{xy,6} \dot{\theta}_3 \cos(\theta_3) \cos(
I_{\text{XV}} \stackrel{\cdot}{d} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + I_{\text{XV}} \stackrel{\cdot}{b} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) - I_{\text{XV}} \stackrel{\cdot}{d} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + I_{\text{XV}} \stackrel{\cdot}{d} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \sin(\theta_4)
I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
I_{xy,5}\dot{\theta}_1\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)-I_{yz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{yz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-I_{yz,5}\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)\sin(\theta_5)
I_{vz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{vz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{vz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-I_{vz,5}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_5)
I_{vz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{vz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{vz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-I_{vz,5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4)
I_{vz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) + 0.125 lc_{5,1}{}^2m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) - 0.125 lc_{5,2}{}^2m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) - 0.125 lc_{5,2}{}^2m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)
I_{xz,5}\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)
0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) - 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a_4 \, a_4 \, a_4 \, \dot{\theta}_4 \, \cos(\theta_4) + 0.5 \, a_4 \, a
0.5 a_1 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + a_1 a_4 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) - 0.25 a_3 a_4 m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) - 0.25 a_3 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) + a_1 a_4 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) + a_1 a_4 m_5 \dot{\theta}_3 \cos(\theta_4) + a_1 a_2 m_5 \dot{\theta}_3 \cos(\theta_4) + a_1 a_2 m_5 \dot{\theta}_4 + a_1 a_2 m_5 \dot{\theta}_3 \cos(\theta_4) + a_1 a_2 m_5 \dot{\theta}_3 \cos(\theta_4) + a_1 a_2 m_5 \dot{\theta}_4 + a_1 a_2 m_5 \dot{\theta}_4 + a_1 a_2 m_5 \dot{\theta}_5 + 
0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) - 0.5 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.5 \, a_2 \, \text{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_2 \, \text{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, a_5 \, a_5
a_1 \ln a_1 \ln a_1 \ln a_2 + a_1 \ln a_2 \ln a_3 \ln a_4 \ln a_4 + a_2 \ln a_4 \ln a_4 + a_2 \ln a_4 \ln a_4 + a_3 \ln a_4 \ln a_4 + a_4 a_4 
0.5 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - 0.75 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_5 \cos(\theta_5
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta
0.25 I_{xx.5} \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_5)} \sin{(2.0 \theta_4)} \cos{(\theta_2)^2} - 0.25 I_{xx.5} \dot{\theta}_1 \cos{(2.0 \theta_4)} \cos{(2.0 \theta_5)} \sin{(2.0 \theta_3)} \cos{(\theta_2)^2} + 0.25 I_{xx.5} \dot{\theta}_1 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(2.0 \theta_5)} \cos{(2.
0.25 I_{vv.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)}^2 + 0.25 I_{vv.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)}^2 + 0.25 I_{vv.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)}^2 + 0.25 I_{vv.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)}^2 + 0.25 I_{vv.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)}^2 + 0.25 I_{vv.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)}^2 + 0.25 I_{vv.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{\text{xx},4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
0.25 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_
0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - a_1 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) + 0.25 a_4 lc_{4,1} m_4 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 lc_{4,1} m_4 \dot{\theta}_5 \cos(\theta_3) \cos(
0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} - a_1 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_4)} - a_1 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, 
0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, d^{-1} \, 
0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.00 \, \sin
0.5 \, a_4 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_2) + 0.75 \, a_3 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_5) + 0.75 \, a_3 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_4) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_4) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_4) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, d_5 
0.5 \, a_4 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_5) + 0.5 \, a_4 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(\theta_3) \, \sin(\theta_4) - 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \text{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, d_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, d_5 \,
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0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_1 \, a_2 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_4)} - 0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_4)} - 0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.125 \, a_4 \, a_4 \, \dot{\theta}_4 \, \dot{\theta}
    a_1 a_4 m_5 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + 0.25 a_3 a_4 m_4 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_4) + 0.25 a_3 a_4 m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_4) - a_1 a_4 m_5 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \dot{\theta}_5 \sin(\theta_4) + a_1 a_4 m_5
    0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} + 0.5 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.375 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} + 0.375 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5
    0.5 \, \text{lc}_{4.1}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{4.2}{}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 
    0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} + 0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} + 0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta
    0.5 I_{xy,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 I_{xy,4} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_1 \sin{(\theta_3)} \sin{(\theta_4)} - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_1 \sin{(\theta_4)} - 0.5 a_2 \ln_{4.1} m_4 \dot{\theta}_2 \sin{(\theta_4)
    a_1 \log_{11} m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + 0.25 a_3 \log_{11} m_4 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_4) - a_1 \log_{11} m_4 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) + 0.5 a_3 \log_{11} m_4 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_4) + 0.5 a_3 \log_{11} m_4 \dot{\theta}_3 \sin(\theta_4) + 0.5 a_3 \log_{11} m_4 \dot{\theta}_4 + 0.5 a_3 \log_{11} m_4 \dot{\theta}_4 + 0.5 a_3
    0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, m_5 \, d_5 \, d_5
    0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 0.00 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \,
    0.25\,I_{\text{vv}}\,_{5}\,\dot{\theta}_{1}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})}\,\cos{(\theta_{2})}^{2} + 0.25\,I_{\text{xx},4}\,\dot{\theta}_{1}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})}\,\cos{(\theta_{2})} + 0.25\,I_{\text{xx},4}\,\dot{\theta}_{1}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})}\,\cos{(\theta_{2})}
    0.25 I_{vv,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 \log_{4,1}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.5 \log_{4,2}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 \log_{4,2}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 \log_{4,2}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(
    0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_
    0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(
    0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4
    0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(
    0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \cos{(\theta_5)}^
    0.5 a_4^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) + 0
    0.125 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \cos
    0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 
    4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.125 a_3 \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_4 \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.125 a_4 \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.125 a_4 \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.125 a_4 \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.125 a_4 \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_
    0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) \sin(\theta_3) + 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(
    0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right) \sin \left(\theta_3\right) - 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_3\right) \cos \left(\theta_4\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_4\right) - 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_4\right) - 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_4\right) - 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_4\right) - 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4.1} \,
    0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_3)}
    0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(
    0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(
    0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.5 a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos
    0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_4) \cos(\theta_5) - 0.00 \, (0.00 \, \theta_4) \, \cos(\theta_4) \, \cos(\theta_4
    0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \, \cos{(
    a_4^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - a_4^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - a_4^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)
    0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_4^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - a_5^2 \sin(\theta_2) - a_5^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)
    0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_
0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{3})^{2}}\cos{(\theta_{4})}\sin{(\theta_{4})} + 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{3})}\cos{(\theta_{4})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{3})} - 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{4})}\cos{(\theta_{5})^{2}}\sin{(\theta_{4})} - 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{3})^{2}}\cos{(\theta_{5})}\sin{(\theta_{5})} - 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{4})}\cos{(\theta_{5})^{2}}\sin{(\theta_{4})} + 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})} + 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})} + 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})} + 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})} + 0.25\,a_{5}^{2}\,m_{5}\,\dot{\theta}_{1}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_{5})^{2}}\sin{(\theta_{5})^{2}}\cos{(\theta_
    0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_4 \log_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 a_2 \log_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 \log_4 \log_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4)
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lc_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) - lc_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \sin (\theta_{3}) + lc_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) - lc_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) - lc_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \sin (\theta_{2}) - lc_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{3}
lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(
lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \sin(\theta_{2}) - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{3})^{2} \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{3})^{2} \cos(\theta_{3}) \cos(\theta_{3})^{2} \cos
 lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} \sin{(\theta_{2})} - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{2})} - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})}^{2} \sin{(\theta_{
\log_{10}(10^{-2} + \log_{1
lc_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{2}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{5})^{2} \sin (\theta_{3}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + lc_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{3})^
lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} \sin(\theta_{5})^{2} 
lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta
\log_{5,2} 2 = 2 + \log_{5} 2 
\log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - \log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - \log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + \log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 +
0.25 I_{xx} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5
0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)^2} - 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)^2} + 0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_{1,2} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
0.5 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4
0.25 \, a_4 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d\phi_5 \, d\phi_
0.5 a_4 \ln 3 \cos(\theta_4) \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_3 \ln 3 \cos(\theta_4) \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 \ln 3 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.25 a_5 \ln 3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
0.25 a_3 \ln c_2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.25 a_2 a_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, a_5
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \dot{\theta}_3 \, 
0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 \cos(2.0 \theta_5) \cos(2.0 \theta
0.5 \log_{4,1} \log_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{4,1} \log_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos
0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0
0.25 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.5 \, a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_2)} \, \cos{(\theta
0.25 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5.1} m_5 \dot{\theta}_1 \sin(\theta_5) + 0.25 a_3 lc_{5.1} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.25 a_3 lc_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.25 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.25 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.25 a_5 lc_{5
0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} 
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta_4)
0.5 \, \text{lc}_{4.2} \, \text{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, \text{lc}_{4.2} \, \text{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)}
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(
0.25 I_{yy,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{yy,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{yy,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{yy,5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)
0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 a_4 \log_4 a_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_4 \log_4 a_4 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_4) \sin(2.0 \theta_4) \cos(\theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) 
0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} \cos(2.0 \theta_5) \cos(\theta_5) \cos
0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{4.1} \log_{4.3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 I_{xy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)
0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.25 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) - 0.25 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) - 0.25 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) - 0.25 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) - 0.25 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5)
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2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + \frac{1}{2} (1 + \frac{1}{2}
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2
0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_
0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) +
0.5 \, a_4 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) - 0.5 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \cos(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_5) \, \cos
a_1 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}
a_4 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_1 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5)
0.5 a_1 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 0.5 a_2 a_4 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 a_4 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_3 a_4 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_3 a_4 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_3 a_4 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_3 a_4 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_3 a_4 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_4 a_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_5 a_5 a_5 \cos(\theta_4) \sin(\theta_2) - a_5 a_5 a_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_5 a_5 a_5 \cos(\theta_4) \sin(\theta_2) - a_5 a_5 \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4)
0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_2 \, a_4 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_2 \, a_4 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_3 \, a_4 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_3 \, a_4 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_3 \, a_4 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_3 \, a_4 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} - a_3 \, a_4 \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_3
    0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos(\theta_5) \, \dot{\theta}_3 \,
0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_3 \cos(\theta_5) - 0.5 a_1 a_5 \dot{\theta}_5 - 0.5 a_1 a_5 \dot{\theta
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 \, \dot{\theta
    0.5 a_1 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_3 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 0.5 a_1 a_5 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) 
0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.00 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,3} 
0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_
lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\cos(\theta_4) + lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4) + 0.125a_5lc_{5,1}m_5\dot{\theta}_1\sin(2.0\theta_3)\sin(2.0\theta_4)\sin(2.0\theta_5) - 0.000a_5c_{5,1}m_5\dot{\theta}_1\sin(2.0\theta_3)\sin(2.0\theta_4)\sin(2.0\theta_5)
a_1 \log_{11} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 \log_{11} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 \log_{11} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - a_2 \log_{11} m_4 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_5) \cos(\theta
0.5 a_2 \ln a_1 + \ln b_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 \ln a_1 \sin(\theta_5) - 0.5 a_2 \ln a_2 \sin(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln a_1 \sin(\theta_5) - 0.5 a_2 \ln a_2 \sin(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln a_1 \sin(\theta_5) - 0.5 a_2 \ln a_2 \sin(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln a_2 \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln a_2 \sin(\theta_5) - 0.5 a_2 \ln a_3 \sin(\theta_5) - 0.5 a_3 \ln a_2 \sin(\theta_5) - 0.5 a_3 \ln a_3 \sin(\theta_5) - 0.5 a_3 \ln
a_1 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(
0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - a_1 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - a_1 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + a_2 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, d\phi_5 
a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 +
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
lc_{4,2} lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - lc_{4,2} lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - lc_{4,2} lc_{4,3} m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - lc_{4,2} lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - lc_{4,3} 
lc_{4,2} lc_{4,3} m_4 \dot{\theta}_4 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_3)} - a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)}^
a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 - a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 + a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 + a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 + a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 + a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 + a_5 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5)^2 + a
a_1 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + a_1 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + a_2 \log_{12} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + a_1 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + a_2 \log_{12} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) + a_1 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_1 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_1 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4)
a_2 \ln_4 2 m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - a_2 \ln_4 2 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin
0.5 a_4 \log_{10} \log_{10} a_4 \log_{10
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a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_1 \log
a_1 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_1 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 \log_{12
a_3 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_4 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin
a_1 \ln a_2 + a_3 \ln a_5 + a_5 
a_3 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - a_4 \log_{13} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) 
a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.25 \log_{11}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{11}^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5
0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
0.25 \log_{2} 2 m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{3}) \cos(\theta_{2})^{2} + 0.5 a_{1} a_{4} m_{4} \dot{\theta}_{1} \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) + a_{1} a_{4} m_{5} \dot{\theta}_{1} \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) + a_{1} a_{2} \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{4}) + a_{2} \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{4}) + a_{3} \sin(\theta_{3}) 
0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + a_2 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + a_4 \, a_4 \, a_5 \, \dot{\theta}_3 \, \sin(\theta_3) \, \sin(\theta_4) + a_5 \, a
a_2 a_4 m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_2 a_5 m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.00 \sin(\theta_5) 
0.5 a_1 a_5 m_5 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 a_5 m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \sin(\theta_5)
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.25 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.25 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} \, \sin{(\theta_2)} \, \cos{(\theta_2)} \, \cos
0.25 \log_{4,2}{}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 2.0 \log_{4,1}{\log_{4,2}{m_4}} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \log_{5,1}{\log_{5,2}{m_5}} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \log_{5,1}{m_5} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 2.0 \log_{5,1}{m_5} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_
2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_5)^2} - 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} + 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} + 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_1 \cos{(\theta_5)^2} + 2.0 \log_{5.2} m_5 \,\dot{\theta}_2 \cos{(\theta_5)^2} + 2.0 \log_{5.2} m_5 \,\dot{\theta}_3 \cos{(\theta_5)^2} + 2.0
lc_{4,1} lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - lc_{4,1} lc_{4,3} m_4 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_1 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_1 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_1 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) + a_1 lc_{4,1} lc_{4,2} lc_{4,3} lc_{4,3} lc_{4,3} lc_{4,3} lc_{4,3} lc_{4,4} lc
a_2 \log_{10} m_4 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{11} m_4 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 \log_{11} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{11} m_4 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{11} m_4 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 \log_{11} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) + a_2 \log_{11} m_4 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 \log_{11} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) + a_2 \log_{11} m_4 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 \log_{11} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) + a_2 \log_{11} m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) + a_3 \log_{11} m_5 \dot{\theta}_3 \sin(\theta_4) + a_4 \log_{11} m_5 \dot{\theta}_4 \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_5 \sin(\theta_5) + a_5 \log_{11} 
a_1 \ln a_1 \ln a_2 + a_3 \ln a_3 \ln a_4 + a_4 \ln a_4 \ln a_5 + a_4 \ln a_5 + a_4 \ln a_5 \ln a_5 + a_4 \ln a_5 \ln a_5 + a_5 \ln a_5 \ln a_5 \ln a_5 + a_5 \ln a_5 \ln a_5 \ln a_5 + a_5 \ln a_5 
a_1 \log_{11} m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5)
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0.25\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\sin{(\theta_4)} - 0.25\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} - 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_4)} - 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_4)} - 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_5)} + 0.25\,\mathrm{lc_{5.1}}^2\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{4.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{4.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \sin(
0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(\theta_4) - 0.25 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_4) + 0.25 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(\theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_
0.5 a_4 \ln a_2 \cos (2.0 \theta_3) \sin (2.0 \theta_4) \cos (\theta_2) + 0.5 a_4 \ln a_2 \cos (2.0 \theta_4) \sin (2.0 \theta_3) \cos (\theta_2) + 0.5 a_4 \ln a_2 \cos (2.0 \theta_4) \sin (2.0 \theta_3) \cos (2.0 \theta_4) \sin 
0.5 \, a_4 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_4) \, \sin(\theta_5) + 0.00 \, a_4 \, \text{lc}_5 \, a_4 \, \text{lc}_
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0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + \log_{4.1} \log_{4.2} m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + \log_{4.2} m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + \log_{4.2} m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + \log_{4.2} m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + \log_{4.2} m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + \log_{4.2} m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + \log_{4.2} m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + \log_{4.2} m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{
lc_{4.1} lc_{4.2} m_4 \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} + 0.25 a_3 lc_{4.2} m_4 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(\theta_4)} + 0.5 a_4 lc_{4.1} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.25 a_3 lc_{4.2} m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)
0.5 a_4 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_4 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_4 lc_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4
4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta
4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5
4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)
0.5 a_2 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \, \dot
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{
0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) +
0.5 a_2 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) \sin(\theta_5)
0.5 a_2 \ln_{5} a_2 \ln_{5} \theta_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_3 \ln_{5} a_2 \ln_{5} \theta_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \ln_{5} a_2 \ln_{5} \theta_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \ln_{5} a_3 \ln_{5} a_4 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \ln_{5} a_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln_{5} a_5 \cos(2.0 \theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 a_3 \log_{10} a_5 = 0.5 a_5 \log_{10} a_5 = 0.5 \log_{10} a_5 \log_{10} a_5 = 0.5 \log_{10} a_5 \log
0.25 a_5 \ln_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_5 \ln_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) +
0.25 a_5 \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5)
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 
0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 \log_{5,1} \log_{5,3} m_5 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_
0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \log_{1.1} \log
a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4)^2 \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2
a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta
a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} - a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta
a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} - a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} - a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta_5)} - a_5 \log_{11} m_5 \dot{\theta}_2 \cos{(\theta_5)} - a_5 \log_{11} m_5 \dot{\theta}_1 \cos{(\theta
a_{5} \ln \log (\theta_{2}) + a_{5} \ln \log (\theta_{2}) + a_{5} \ln \log (\theta_{3}) + a_{5} \ln \log (\theta_{5}) + a_{5
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_3 \log_{10} m_5 
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, 
0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_3 \sin(\theta_5) - 0.5 \log_{5.3} m_5 \dot{\theta}_3
0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.25 a_5 lc_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.00 cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5) \cos(
0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)}
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 \log_{10} \log_{
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0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) - 0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_2)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_2)}\,\cos{(\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_2)}\,\sin{(\theta_3)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_2)}\,\cos{(\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_2)}\,\sin{(\theta_3)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\cos{(\theta_4)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\cos{(\theta_4)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\cos{(\theta_4)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)}\,\cos{(\theta_4)}\,\sin{(\theta_4)} - I_{\mathrm{xx},4}\,\dot{\theta}_1\,\cos{(\theta_4)} - I_{\mathrm{xx},4}\,\dot
I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)-I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)\sin(\theta_4)
I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)+I_{xx,5}\dot{\theta}_1\cos(\theta_4)\cos(\theta_5)\sin(\theta_5)\sin(\theta_5)
I_{\text{vv},4}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{\text{vv},5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{\text{vv},6}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)
I_{\text{vv},5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{\text{vv},5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)-I_{\text{vv},5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)\sin(\theta_5)
I_{\text{VV}} = \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5)
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_2) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\cos(\theta_2) + 0.5\,a_4\,lc_{5,1}m_5\dot{\theta}_1\cos(2.0\,\theta_2)\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(\theta_5) + 0.5\,a_4\,lc_{5,1}m_5\dot{\theta}_1\cos(2.0\,\theta_2)\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(\theta_5) + 0.5\,a_4\,lc_{5,1}m_5\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta
0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 2.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
2.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 2.0 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 2.0 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 2.0 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} -
2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - \log_{5.2} \log_{5.3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - \log_{5.2} \log_{5.
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 1.0 cm
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_1 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + a_1 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + a_2 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_4) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
a_2 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) 
0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)}
0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, \cos{(\theta_5)} \, d_5 \, d_5
0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5)
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) 
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta
0.5 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + a_1 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_1 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)}
a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
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a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_
0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + a_2 \log_1 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \log_1 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + a_2 \log_1 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_2 \log_1 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + a_2 \log_1 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + a_3 \log_1 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + a_4 \log_1 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_4 \log_1 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
a_2 \ln 1 = a_2 \ln 1 = a_3 \ln 1 = a_4 \ln 1 = a_5 
0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) - lc_{4,2} lc_{4,3} lc_{4,4} lc_{4,
lc_{41}lc_{42}m_4\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_4) + lc_{41}lc_{42}m_4\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4) - lc_{51}lc_{52}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_2)\sin(\theta_3) - lc_{51}lc_{52}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_3) + lc_{41}lc_{42}m_4\dot{\theta}_1\cos(\theta_3)\sin(\theta_4) + lc_{51}lc_{52}m_5\dot{\theta}_1\cos(\theta_3)\sin(\theta_3)\sin(\theta_3) + lc_{51}lc_{52}m_5\dot{\theta}_1\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_4)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_5)\sin(\theta_2)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_3)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)+lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{2})\cos(\theta_{4})\sin(\theta_{3})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{2})\cos(\theta_{5})\sin(\theta_{3})\sin(\theta_{4})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{2})\cos(\theta_{3})\sin(\theta_{4})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}m_{5,3}
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_1 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_1 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_1 lc_{5,2} lc_{5,3} lc_{5,3}
a_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(
a_2 \ln \log a_2 = 2 \ln \log a_3 = 2 
a_2 \ln a_2 \ln a_3 \ln a_4 \cos (\theta_4) \sin (\theta_2) \sin (\theta_3) \sin (\theta_5) - a_2 \ln a_2 \ln a_3 \cos (\theta_5) \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) - a_2 \ln a_3 \ln a_4 \cos (\theta_5) \sin (\theta_5) - a_5 \ln a_5 \cos (\theta_5) \sin (\theta_5
a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_
0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.125 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.00 \cos(2.0 \theta_5) \cos(2.
0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, a
0.5 a_2 a_5 m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5.1} lc_{5.3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5.1} lc_{5.3} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5.1} lc_{5.3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + lc_{5.1} lc_{5.3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.00 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta
a_1 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) \sin(\theta_
a_2 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) + 0.5 a_5 \dot{
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 +
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 a_4 \log_{10} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 a_4 \log_{10} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, d_5 \, d_
0.25 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + a_4 \log_1 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(\theta_5) + a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(\theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5)
a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) + a_4 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, \dot{\theta}_4 \, \sin(\theta_5) + 0.125 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_5 \, \log_{5,2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.00 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \cos(
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_2)} \, d_2 \, d_3 \, d_3
0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.
0.25 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
a_4 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) - a_4 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) - a_4 \log_2 m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
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0.5\,a_4\,a_5\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)}\,\sin{(\theta_5)} - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 - 0.5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,
    0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
    0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_2) - 0.5 \lg_{4.1} \lg_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin
    0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_4 \log_{10} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_4 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_4 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_4 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_
    0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \,
    2.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 4.0 \log_{10}
    0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) 
    a_4^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta
    0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
    0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos
    0.25 a_5 \log_{10} a_5 
    lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{4,2}^2 m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
    {{\rm lc}_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - {{\rm lc}_{5,2}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + \frac{1}{2} \, \sin{(\theta_4)} + \frac{1}{2} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos
\log_{5,1} 2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + \log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + \log_{5,2} 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
    0.5 \log_{11} \log_{22} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{22} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5
    0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
    0.25 a_5 \ln a_5 \ln a_5 + a_5 \ln a_5 \ln
    0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} m_5 \dot{\theta}_2 \sin(\theta_2) + 0.5 \log_{11} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_2) + 0.5 \log_{11} m_5 \dot{\theta}_2 \sin(\theta_2) \sin
    2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 
    2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^
    2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin
    2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx} = 5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
    2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
    2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
    a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_4 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_4) + a_4 
    a_4 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta
    a_5 \log_{10} a_5 \log_{10
    a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) 
    a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \cos(\theta_5) \sin(\theta_5
    a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
    a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
    a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{11} \log_{12} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 \log_{11} \log_{11} \log_{12} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_3) + 2.0 \log_{11} \log_
    2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_
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2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{1.1} \log_{
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2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
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4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.1
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4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5
4.0 I_{xy} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 l_{c_4} l_{c_4} l_{c_4} l_{c_4} l_{c_4} l_{c_4} l_{c_4} l_{c_5} l_
a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
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0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{2})} \sin{(\theta_{3})} \sin{(\theta_{4})} - 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{3})} \sin{(\theta_{5})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \sin{(\theta_{5})} \sin{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})}
2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{2}) \sin(\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}
2.0 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta
2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_3)} \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{
2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m
2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5
2.0 a_5 \operatorname{lc}_{5,2} m_5 \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5) \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 4.0 \operatorname{lc}_{5,1} \operatorname{lc}_{5,2} m_5 \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5) \sin (\theta_2) \sin (\theta_4) \sin (\theta_5)
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(A31)

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C_{15} = 0.25 I_{xy,5} \dot{\theta}_1 + 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_4)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2
0.5 I_{zz,5} \dot{\theta}_2 \cos(\theta_2) - 0.125 a_5 \lg_{5,2} m_5 \dot{\theta}_1 - 0.25 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_1 - I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 - I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \sin(\theta_3)^2 - I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_3 \cos(\theta_3)^2
    I_{xy,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_5)^2 + I_{xy,5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_4)^2 + I_{xy,5}\dot{\theta}_1\cos(\theta_3)^2\cos(\theta_5)^2 + I_{xy,5}\dot{\theta}_1\cos(\theta_4)^2\cos(\theta_5)^2 - I_{xy,5}\dot{\theta}_1\cos(\theta_5)^2 + I_{xy,5}\dot{\theta}
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) + 0.25 I_{yx} 5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yx} 5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{yx} 5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{yx} 5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{yx} 5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{yx} 5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 0.25 I_{yx} 5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 0.25 I_{yx} 5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_
0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_5 \cos(\theta_5) + 0.25 
0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos{(\theta_2)} - 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos{(\theta_2)} - 0.5 I_{\text{xx},5} \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \log_{10}^{2} \sin{(\theta_2)} - 0.5 \log_{10}^{2} \sin{(\theta_2)} \cos{(\theta_2)} \cos{(\theta
0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) + 
0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4)
0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{vv,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{vv,5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3) + 0.5 I_{vv,5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(
0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_4) + 0.5 I_{\text{vv.}5} \dot{\theta}_2 \cos(\theta_4) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_4) + 0.5 I_{\text{vv.}5} \dot{\theta}_2 \cos(\theta_
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) 
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin{(\theta_3)^2} + 0.25 a_5 
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 + 0.5 \log_1 \log_2 \theta_1 \cos(\theta_3)^2 + 0.00 \log_2 \theta_2 \cos(\theta_3)^2 + 0.00 \log_2 \theta_1 \cos(\theta_3)^2 + 0.00 \log_2 \theta_2 \cos(\theta_3)^2 + 0.00 \log_2 \theta_3 \cos(\theta_
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_4)^2 + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.25 I_{xv.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) +
0.125 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.125 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)
0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} - 0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} 
0.25 I_{xv,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 I_{xv,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 I_{xv,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} - 0.25 I_{xv,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2
0.125 I_{xx,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.00625 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) 
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} 
0.375 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.75 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.75 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \log_{5,1}{}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \log_{5,1}{}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_3)} \cos{
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.5 \log_{5,2}{}^2 \sin{(\theta_2)} + 0.5 \log_{
0.5 \log_{2} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) - 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{4}) \sin(\theta_{4}) - 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{2} \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{2} \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{3} \cos(\theta_{3}) \sin(\theta_{3})
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_5)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_5)} + 0.5 \log_{
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 \cos{(\theta_5)} 
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.5 \log_{5,2}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,2}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_4)} 
0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + 0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \sin(\theta_{5}) + 0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \sin(\theta_{5}) + 0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \sin(\theta_{5}) + 0.5 \lg_{5,1}{}^{2} 
0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5
0.125 \, a_4 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_5) + 0.125 \, a_4 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(2.0 \, \theta_2) + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \sin(\theta_5) + 0.000 \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5)
0.125 a_4 lc_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{yz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_2 \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_2 \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_3 \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_4 \sin(\theta_5) - 0.5 I_{vz,5} \dot{\theta}_5 \sin(\theta_5) - 0
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0.5 I_{xz,5} \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_4)} - 0.5 I_{xz,5} \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} + I_{xx,5} \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} + I_{xx,5} \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} + I_{xx,5} \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_4)} + I_{xx,5} \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + I_{xx,5} \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos
I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)^2\cos(\theta_5)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)^2\cos(\theta_5)^2\sin(\theta_2)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)+I_{xx,5}\dot{\theta}_1\cos(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_3)^2\sin(\theta_
I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_3)^2 \cos
I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_4)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_3)^2\cos(\theta_5)\sin(\theta_5)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)^2\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_5)
I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) - I_{yy,5} \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) - I_{yy,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 
I_{yy,5} \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_5)^2 \sin (\theta_2) - I_{yy,5} \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3) \cos (\theta_4)^2 \sin (\theta_3) - I_{yy,5} \dot{\theta}_1 \cos (\theta_2) \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_2) - I_{yy,5} \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_3)^
I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - I_{\text{vv.5}} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^
I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + I_{\text{vv}} = \hat{\theta}_1 \cos(\theta_5)^2 \cos(\theta_
I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0\,\theta_2) \cos(\theta_3) \sin(\theta_4) + I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0\,\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0\,\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0\,\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vz},5} \dot{\theta}_5 \cos(\theta_
0.5 I_{vz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.0625 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) - 0.5 I_{vz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_2 \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_3 \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_4 \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_4 \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_5 \dot{\theta}_5 \sin(\theta_5) + 0.5 I_{vz.5} \dot{\theta}_5 \dot{\theta}_5 \dot{\theta}_5 \dot{\theta}_5 \dot{\theta}_5 \dot{\theta}_5 \dot{\theta}_5 \dot{\theta}_
0.5 I_{xx.5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy.5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) +
0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.125 a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0\theta_2) \cos(\theta_5) + 0.25 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \cos(\theta_2) - 0.00 \log_{10} m_5 \dot{\theta}_1 \sin(2.0\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.125 a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0\theta_2) \cos(\theta_5) + 0.25 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) + 0.00 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) + 0.00 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) + 0.00 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + 0.00 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5
0.5 a_4 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_2) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_2) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_2) - 0.125 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_2) + 0.00 \cos(\theta_5) \cos(\theta
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + I_{xx,5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + I_{xx,5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0
I_{\text{xv.5}}\dot{\theta}_2\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)} + I_{\text{xv.5}}\dot{\theta}_2\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_3)}\cos{(\theta_2)} - 0.25\,a_4\,\mathrm{lc_{5.1}}\,m_5\,\dot{\theta}_2\cos{(\theta_5)}\sin{(\theta_2)} + 1_{\text{xv.5}}\dot{\theta}_2\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin
0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.00 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_{5.2} \, \mathrm{lc}_{5.2} \,
0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + 0.00 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_{5,2} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_{5,2} \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_{5,2} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_
0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_2)} - 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} - 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(
0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(
0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.03125 a_5^2 a_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_5) 
I_{\text{vz},5} \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \sin(\theta_3)^2 + 0.5 a_5 \ln_{5,2} m_5 
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_5)^2} - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)^2} - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(
0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.125 a_4 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.25 a_4 \log_{12} m_5 \dot{\theta}_2 \sin(\theta_5) \sin(\theta_2) - 0.125 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \sin{(\theta_2)} - 0.125 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{5})} \sin{(2.0\,\theta_{4})} - 0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{4})} \cos{(2.0\,\theta_{5})} \sin{(2.0\,\theta_{5})} + 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} + 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} + 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos
0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{4})} + 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{4})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{3})} + \lg_{5,1} \lg_{5,2}{m_{5}} \dot{\theta}_{1} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})}^{2} + \lg_{5,1} \lg_{5,2}{m_{5}} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 - lc_{5,2} m_5 
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)^2\cos(\theta_5)^2-I_{xy,5}\dot{\theta}_2\sin(2.0\theta_3)\sin(2.0\theta_4)\sin(2.0\theta_5)\cos(\theta_2)+I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)
I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)+I_{xz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_3)\sin(\theta_4)
I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)+I_{xz,5}\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)
I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4) + I_{xz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3) + 0.03125\,a_5^2\,m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.03125\,a_5^2\,m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)
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I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) \sin(\theta_5)
I_{xy,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)-I_{xy,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)-I_{xy,5}\dot{\theta}_1\cos(\theta_4)\sin(\theta_5)-I_{xy,5}\dot{\theta}_1\cos(\theta_4)\sin(\theta_5)
I_{vz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{vz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-I_{vz,5}\dot{\theta}_3\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{vz,5}\dot{\theta}_3\cos(\theta_2)\sin(\theta_3)\sin(\theta_5)
I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_5) - I_{vz} = \hat{\theta}_4 \cos(\theta_3) \cos(\theta
I_{vz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{vz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-I_{vz,5}\dot{\theta}_5\cos(\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+I_{vz,5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)
0.125 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) - 0.125 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) - I_{xz,5} \dot{\theta}_{3} \cos(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - I_{xz,5} \sin(\theta_{5}) \sin(\theta_{5}) + I_{xz,5} \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(
I_{xz,5}\dot{\theta}_4\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) - I_{xz,5}\dot{\theta}_5\cos(\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) - 0.375a_3a_5m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_5) - 0.375a_3a_5m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_5)
0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.75 a_3 l_{5.1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + 0.25 a_4 l_{5.2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5,2} \, m_5
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, a_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.25 \, I_{xx,5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 0.25 \, I_{xx,5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.25 I_{yy} = \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_5 l_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 l_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{yy} = 0.25 a_5 l_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 l_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 l_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 l_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 l_{5,1
0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_
0.75 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_
0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_
0.25 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.375 a_3 a_5 m_5 \dot{\theta}_1 \sin(\theta_4) \sin(\theta_5) + 0.5 I_{xv,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xv,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.
0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
0.75 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot
0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)}^2 + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \sin{(\theta_4)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.125 a_4 l_{\text{c}_{5,1}} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) - 4.0 I_{\text{c}_{5,1}} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.125 a_4 l_{\text{c}_{5,1}} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) - 4.0 I_{\text{c}_{5,1}} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.125 a_4 l_{\text{c}_{5,1}} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) - 4.0 I_{\text{c}_{5,1}} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.125 a_5 l_{\text{c}_{5,1}} \dot{\theta}_3 \cos(\theta_5) \cos(
0.25 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)^2} \, \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \sin{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 lc_{5,1} m_5 \dot{
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 
0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_4)} + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{
0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)
0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2}
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0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - \mathrm{lc}_{5.1}^{\, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - \mathrm{lc}_{5.1}^{\, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - \mathrm{lc}_{5.1}^{\, 2} \, \sin{(\theta_2)} - \mathrm{lc}_{5.1}^{\, 2} \, \sin{(\theta_2)} + \mathrm{lc}_{5.1}^{\, 2} \, \cos{(\theta_2)} \, \cos{(\theta_2)
lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - lc_{5,1}^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - lc_{5,1}^2 \sin(\theta_4) + lc_{5,2}^2 \sin(\theta_4) + lc_{5,2}^2 \sin(\theta_4) \cos(\theta_4)^2 \sin(\theta_4) + lc_{5,2}^2 \cos(\theta_4)^2 \sin(\theta_4) + lc_{5,2}^2 \cos(\theta_4)^2 \sin(\theta_4) + lc_{5,2}^2 \cos(\theta_4)^2 \cos(\theta
{\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2) \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_2) - {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3) \cos (\theta_5)^2 \sin (\theta_3) - {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_4) \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4) \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4) \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_4)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_5)^2 \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_5)^2 \sin (\theta_4) + {\rm lc_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_5)^2 \sin (\theta_5)^2 \cos 
lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{4})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{3})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \sin(\theta_{2}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{2} \sin(\theta
\log_{5.2} 2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + \log_{5.2} 2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + \log_{5.2} 2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + \log_{5.2} 2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_
{\rm lc_{5.1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_4\right) - {\rm lc_{5.1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + {\rm lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right
lc_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{4}) - lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{4}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + lc_{5,2}^{2} m_{5} \dot{\theta}_{1} 
\log_{2} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + \log_{2} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + \log_{2} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + \log_{2} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) + \log_{2} 2 m_{5} \dot{\theta}_{2} \cos(\theta_{5}) \sin(\theta_{5}) + \log_{2} 2 m_{5} \dot{\theta}_{3} \sin(\theta_{5}) + \log_{2} 2 m_{
lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} - lc_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} + 0.125 a_{5}^{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \theta_{3})} \cos{(2.0 \theta_{4})} \cos{(2.0 \theta_{5})} \cos{(\theta_{2})} + 0.125 a_{5}^{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \theta_{3})} \cos{(2.0 \theta_{5})} \cos{(2.
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{
0.25 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \dot{\theta}_3 \,
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)}
0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - 0.25 a_3 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) +
0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) - 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.25 a_5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \sin(\theta_
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 \cos(2.0 \theta_5) \cos(
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta
0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(\theta_5) - 0.25 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(\theta_5) - 0.25 a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \cos(\theta_5) \cos(
0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) - 0.5 \log_{11}^{2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_5) \cos(\theta_
0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 I_{xy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.125 a_5 \log_{10} a_5 \log(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.125 a_5 \log_{10} a_5 \log(2.0 \theta_4) \cos(2.0 \theta_5) \cos(2.0 \theta_5)
0.25 \log_{10} \log_{10} \log_{10} (2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 2.0 I_{xx} + \frac{1}{2} i \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - \frac{1}{2} i \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5
2.0 I_{\text{vv}} = \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) +
0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.125 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) + 0.125 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(
0.125\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)} - 0.5\,a_2\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(\theta_3)}\,\cos{(\theta_4)}\,\cos{(\theta_5)} - a_1\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_3)}\,\cos{(\theta_4)}\,\cos{(\theta_5)} + a_2\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} - a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} - a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} + a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} + a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} - a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} + a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} + a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} + a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} + a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,\cos{(\theta_5)} + a_3\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}
0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5
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0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, \dot{\theta}_3 \, \dot{\theta}
    0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5)
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 \, 
0.5 a_1 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_3 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 0.5 a_1 a_5 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) 
0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_1 a_5 m_5 \dot
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.00 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,3} 
0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_
0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5
0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_1 \ln_{5.1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \ln_{5.1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \ln_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_1 \ln_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) 
a_1 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 
a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_1 \ln_{5,1} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \ln_{5,1} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \ln_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_4) - a_1 \ln_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_1 \ln_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_
a_1 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_3 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)^2} - a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} - a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_3)^2}
a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.5 a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 + 0.5 a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 0.5 a_2 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5)^2
0.5 a_2 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_1 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_3 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_2 m_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_2 m_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_2 m_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_2 m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_2 m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_2 m_5 \cos(\theta_5) \cos
a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) 
a_1 \ln a_2 + a_3 \ln a_4 + a_4 \ln a_5 + a_5 
a_3 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12} m_5 \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_
a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_3 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) - a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_1 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 \log_{12} m_
a_3 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)}^2 + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)}^2 + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)}^2 + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)}^2 + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)}^2 + 0.25 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_
0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5) 
0.25 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{4}) \cos(\theta_{2})^{2} - 0.25 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{3}) \cos(\theta_{2})^{2} +
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, 
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_5 
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 - 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 - 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 - 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.5 a_2 \log_{5.1} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \log_{5.1} m_5 \dot{\theta}_1 \sin(\theta_5) + 0.5 a_2 \log_{5.1} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.5 a_2 \log_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.
a_1 \ln a_1 \ln a_2 + a_3 \ln a_3 \ln a_4 + a_4 \ln a_4 \ln a_5 + a_4 \ln a_5 + a_4 \ln a_5 \ln a_5 + a_4 \ln a_5 \ln a_5 + a_5 \ln a_5 \ln a_5 \ln a_5 + a_5 \ln a_5 \ln a_5 \ln a_5 + a_5 \ln a_5 
a_1 \log_{11} m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5)
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, d_5 \, 
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_
2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xy.5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) 
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
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2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xy,5
0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 +
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_4 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_4 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_4 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_4 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_4 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_4 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_4 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2
0.25 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, 
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 4.0 \, I_{xy,5} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 1.0 \, \mathrm{lc}_{xy,5} \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)
4.0 I_{xy,5} \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5) \sin (\theta_2) \sin (\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5) \sin (\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos (\theta_5) \sin (\theta_5) \sin (\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos (\theta_5) \sin (\theta
4.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_3)} \sin{(\theta_4)} + 4.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 4.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(
4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) +
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \,
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.00 \, \mathrm{lc}_{5.1} \, 
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \cos
0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.0625 a_5^2 \sin(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_4) \cos(\theta_5) + 0.0625 a_5^2 \cos(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 \log_2 \log_3 m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) - 0.5 \, a_2 \log_2 m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \log_2 \log_3 m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \log_2 \log_3 m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \log_2 \log_3 m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \log_2 \log_3 m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \log_3 m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5)
0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_
0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_2 \sin(\theta_3) + 0.25 a_5 \log_3 m_5 \dot{\theta}_3 \cos(\theta_3) + 0.25 \log_3 m_5 \cos(\theta_3) + 0.25 \log_3 m_5 \cos(\theta_3) + 0.25 \log_3 m_5 \cos(\theta_3
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)}
0.25 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{5.2}^{2} \sin(\theta_5) \cos(\theta_5) \cos(\theta_
0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.1} m_5 \dot{\theta}_2 \sin(\theta_3) - 0.5 \lg_{5.1} \lg_{5.1} m_5 \dot{\theta}_3 \sin(\theta_3) - 0.5 \lg_{5.1} l_5 \dot{\theta}_3 \sin(\theta_3) - 0.5 \lg
a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(
a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta
a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} - a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 
a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + a_5 \log_{11} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) - 0.5 a_
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_2 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_2 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.2} \log_{5.3} m_5 \,\dot{\theta}_2 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.3} m_5 \,\dot{\theta}_2 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.3} m_5 \,\dot{\theta}_2 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} - 0.5 \log_{5.3} m_5 \,\dot{\theta}_3 \sin{(\theta_5)} - 0.
0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.00 \log_{10} 
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.25 a_5 lc_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.00 cos(\theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \cos(\theta_2) \cos(\theta_3) \cos(2.0 \theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.00 cos(\theta_4) \cos(2.0 \theta_5) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
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0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(\theta_2)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 \cos{(\theta_2)} 
0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{
0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.25 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - I_{xx,5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5
I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)-I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{xx,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_3)\sin(\theta_5)
I_{xx,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)+I_{yy,5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{yy,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)
I_{\text{VV},5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5) + I_{\text{VV},5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5) - I_{\text{VV},5}\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_5)
I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.125 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(2.0
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 0.25 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 0.25 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
0.25 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \,
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5
2.0 \log_{10} 2.0 \log_{10
2.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 2.0 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} -
2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - \log_{5.2} \log_{5.3} m_{5} \dot{\theta}_{3} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) - \log_{5.2} \log_{5.
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{2})\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5}) - lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{2})\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5}) - 0.25a_{4}lc_{5,2}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{4})\sin(\theta_{5}) + 0.25a_{4}lc_{5,2}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{4})\sin(\theta_{5}) + 0.25a_{4}lc_{5,2}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{4})\sin(\theta_{5}) + 0.25a_{4}lc_{5,2}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3})\sin(2.0\,\theta_{3}
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_1 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + a_1 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
a_2 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5)
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0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(
0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta
0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) 
0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \cos(\theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \cos
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_2)\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_2)\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_2)\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_1 lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + a_1 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + a_1 lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_1 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 lc_{5,1} lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 lc_{5,1} lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 lc_{5,2} lc_{5,2} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + a_1 lc_{5,2} lc_{5,2} lc_{5,2} lc_{5,2} cc_{
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a_1 \log_{1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + a_1 \log_{1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta
a_2 \ln 1 + m_5 + 
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + a_2 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + a_2 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + a_2 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_2 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + a_3 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{11} m_5 \cos(\theta_5) \cos(
a_2 \ln 1 + m_5 + 
a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \sin(\theta
0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - \log_2 \log_2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_2 m_5 \cos(\theta_5) \cos(\theta
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_2)\sin(\theta_4) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_5)\sin(\theta_2)\sin(\theta_5) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_3)\sin(\theta_4) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_4)\sin(\theta_4) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\sin(\theta_4) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_4)\cos(\theta_5
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)+lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,3}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
lc_{5/2}lc_{5/3}m_{5}\dot{\theta}_{4}\cos(\theta_{2})\cos(\theta_{4})\sin(\theta_{3})\sin(\theta_{5})+lc_{5/2}lc_{5/3}m_{5}\dot{\theta}_{4}\cos(\theta_{2})\cos(\theta_{5})\sin(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5}\dot{\theta}_{5}\cos(\theta_{2})\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5}\dot{\theta}_{5}\cos(\theta_{2})\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{2})\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4})+lc_{5/2}lc_{5/3}m_{5/2}\dot{\theta}_{5/2}\cos(\theta_{3})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta_{4/2})\sin(\theta
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_1 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_1 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_1 lc_{5,2} lc_{5,3} lc_{5,3}
a_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(
a_2 \ln \log a_2 = 2 \ln \log a_3 = 2 
a_2 \ln a_2 \ln a_3 \ln a_4 \cos (\theta_4) \sin (\theta_2) \sin (\theta_3) \sin (\theta_5) - a_2 \ln a_2 \ln a_3 \cos (\theta_5) \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) - a_2 \ln a_3 \ln a_4 \cos (\theta_5) \sin (\theta_5) - a_5 \ln a_5 \cos (\theta_5) \sin (\theta_5
a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_
0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.125 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.00 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.00 \cos(2.0 \theta_5) \cos(2.
0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) - 0.5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, a
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \sin{(\theta_5)} + \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.00 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, 
a_1 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) \sin(\theta_
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_5) \, \cos(2.0 \, 
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d\phi_3 \, \cos{(\theta_5)} \, d\phi_3 
0.25 a_3 \log_{10} a_5 = 0.25 a_5 \log_{10} a_5 
0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, d
0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} 
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.000 \, \sin{(\theta_5)} + 
0.25 a_5 \log_{10} a_5 
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_3 \log_1 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_3 \log_1 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d\phi_5 \, d\phi_
0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5
0.5 a_4 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - 0.25 a_4 a_5 a_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.25 a_4 a_5 a_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.25 a_4 a_5 a_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.25 a_5 a_5 \dot{\theta}_3 \sin(2.0 \theta_4) \cos(\theta_5) - 0.25 a_5 a_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.25 a_5 a_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.5 \log_{11} \log_{22} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{22} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{11} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
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0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_5) \cos(
0.25 a_3 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + 0.00 cos(\theta_5) \sin(\theta_5) + 0.00 cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
2.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 4.0 \log_{10} m_5 \dot{
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(\theta_4) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3)
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
0.25 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(2.0 \theta_5)}
0.25 a_5 \log_{10} a_5 
lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) 
{\operatorname{lc}_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_5) \sin (\theta_2) \sin (\theta_3) \sin (\theta_5) - {\operatorname{lc}_{5,2}}^2 m_5 \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_5) \sin (\theta_3) \sin (\theta_5) + {\operatorname{lc}_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_5) \sin (\theta_5) + {\operatorname{lc}_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_5) \sin (\theta_5) + {\operatorname{lc}_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_5) \sin (\theta_5) \sin (\theta_5) + {\operatorname{lc}_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_5) \sin (\theta_5) \sin (\theta_5) \sin (\theta_5) \sin (\theta_5) + {\operatorname{lc}_{5,1}}^2 m_5 \dot{\theta}_1 \cos (\theta_5) \sin (
lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - lc_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
\log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(
0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_
0.25 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \sin(\theta_
a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(
a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \cos(
2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{10} \log_{
2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2.0 \log_{5,1} \log_{5,2} m_5 \,\dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} - 2.0 \log_{5,1} \log_{5,2} m_5 \,\dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,1} \log_{5,2} m_5 \,\dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2} m_5 \,\dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2} m_5 \,\dot{\theta}_3 \cos{(\theta_5)} \cos
4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{1.1} 
4.0 \log_{10} \log_{
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 $4.0 \log_{10} \log_{$ $4.0 I_{xy} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5 l_{c_5} l_{c_5} l_{c_5} l_{c_5} l_{c_5} l_{c_5} \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_5 l_{c_5} l_$ $a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)$ $a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos$ $0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5$ $0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 2.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_2)} \sin{(\theta_4)} - 2.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_4)} - 2.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} - 2.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} - 2.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos$ $2.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 2.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) - 2.0 \log_{5.2}{}^2 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)$ $2.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 2.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 2.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5$ $2.0 \log_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 2.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{4}) \sin(\theta_{5}) + 2.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{4}) \sin(\theta_{5}) + 2.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{4}) \sin(\theta_{5}) + 2.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) + 2.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}$ $2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - 2.0 a_{5} \log_{5,2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) \sin(\theta_{3}) - 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) \sin(\theta_{3}) - 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{3}) - 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{5}) - 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{5}) - 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5})$ $2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_$ $2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right) \cos \left(\theta_4\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_3\right) \sin \left(\theta_4\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right) \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right) \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right) \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_5\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, d_5 \, d_$ $2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right) \sin \left(\theta_4\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_3\right) \cos \left(\theta_4\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_3\right) \sin \left(\theta_4\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_3\right) \cos \left(\theta_4\right) \cos \left(\theta_5\right) \sin \left(\theta_4\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right) \cos \left(\theta_4\right) \cos \left(\theta_5\right) \sin \left(\theta_4\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_4\right) \cos \left(\theta_5\right) \sin \left(\theta_4\right) \sin \left(\theta_5\right) - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \cos \left(\theta_5\right) \sin \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_5\right) \cos \left(\theta_5\right) \sin \left(\theta_5\right) \sin \left(\theta_5\right) \sin \left(\theta_5\right) \cos \left(\theta_5\right) \sin \left(\theta_5\right) \sin \left(\theta_5\right) \cos \left(\theta_5\right) \sin \left(\theta_5\right) \sin \left(\theta_5\right) \sin \left(\theta_5\right) \cos \left(\theta_5\right) \sin \left$ $2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)$ $2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{$ $4.0 \log_{11} \log_{22} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5)$ (A32)

```
C_{21} = -I_{xz,2}\dot{\theta}_1\cos(2.0\,\theta_2) + 0.5\,I_{xx,2}\dot{\theta}_1\sin(2.0\,\theta_2) + 0.25\,I_{xx,3}\dot{\theta}_1\sin(2.0\,\theta_2) + 0.25\,I_{xx,4}\dot{\theta}_1\sin(2.0\,\theta_2) + 0.25\,I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_2) + 0.25\,I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_2) + 0.25\,I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_2) + 0.25\,I_{xx,4}\dot{\theta}_1\cos(2.0
0.25 I_{xx,5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} + 0.25 I_{yy,3} \dot{\theta}_1 \sin{(2.0\,\theta_2)} + 0.25 I_{yy,4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} + 0.25 I_{yy,5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} - 0.5 I_{zz,2} \dot{\theta}_1 \sin{(2.0\,\theta_2)} + 0.5 I_{zz,2} \dot{\theta}_2 \sin{(2.0\,\theta_2)} + 0.5 I_{zz,
0.5 I_{zz,3} \dot{\theta}_1 \sin(2.0 \theta_2) - 0.5 I_{zz,4} \dot{\theta}_1 \sin(2.0 \theta_2) - 0.5 I_{zz,5} \dot{\theta}_1 \sin(2.0 \theta_2) + 0.5 I_{zz,3} \dot{\theta}_3 \cos(\theta_2) + 0.5 I_{zz,4} \dot{\theta}_3 \cos(\theta_2) + 0.5 I_{zz,4} \dot{\theta}_3 \cos(\theta_2) + 0.5 I_{zz,5} \dot{\theta}_4 \sin(2.0 \theta_2) + 0.5 I_{zz,5} \dot{\theta}_5 \cos(\theta_2) 
0.5 I_{zz,4} \dot{\theta}_4 \cos(\theta_2) + 0.5 I_{zz,5} \dot{\theta}_3 \cos(\theta_2) + 0.5 I_{zz,5} \dot{\theta}_4 \cos(\theta_2) + 0.5 I_{zz,5} \dot{\theta}_5 \cos(\theta_2) - 0.25 I_{xx,3} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.5 I_{zz,5} \dot{\theta}_5 \cos(\theta_2) 
0.25 I_{yy,3} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.5 I_{xy,3} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) + 0.5 I_{xx,3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) - I_{yz,3} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) - 0.5 I_{yy,3} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 I_{xy,3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_
0.5 I_{\text{vv},3} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) - I_{\text{xz},3} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) - I_{\text{xv},3} \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) - 0.125 a_2^2 m_2 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.125 a_2^2 m_2 \dot{\theta}_2 \sin(2.0 \theta_2) - 0.125 a_2^2 m_2^2 \dot{\theta}_2 \sin(2.0 \theta_2) - 0.125 a_2^2 \dot{\theta}_2 \sin(2.
0.5 a_2^2 m_3 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.5 a_2^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.0625 a_3^2 m_3 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.5 a_2^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.5 a_2^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) - 0.0625 a_3^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_2) - 0.0625 a_3^2 \dot{\theta}_2 \sin(2.0 \theta_2) - 0.0625 a_3^2 \dot{\theta}_3 \sin(2.0 \theta_2) - 0.0625 a_3^2 \dot{\theta}_3 \sin(2.0 \theta_2) - 0.0625 \dot{\theta}_3 \sin(2.0 \theta_2) - 
0.25 \, a_3^2 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_4^2 \, m_5 \, 
0.0625 a_5^2 m_5 \dot{\theta}_1 \sin{(2.0 \theta_2)} - 0.5 \log_{10}^2 m_2 \dot{\theta}_1 \sin{(2.0 \theta_2)} + 0.5 \log_{10}^2 m_2 \dot{\theta}_1 \sin{(2.0 \theta_2)} - 0.25 \log_{10}^2 m_3 \dot{\theta}_1 \sin{(2.0 \theta_2)} + 0.25 \log_{10}^2 m_3 \dot{\theta}_2 \sin{(2.0 \theta_2)} + 0.25 \log_
0.25 \log_{3.2}{}^2 m_3 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} + 0.5 \log_{3.3}{}^2 m_3 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} - 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} - 0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} + 0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_2 \sin{(2.0 \,\theta_2)} + 0.25 \log_{4.2}{}^2 m_4 
0.5 \ln_{4.3}{}^{2} m_{4} \dot{\theta}_{1} \sin(2.0 \theta_{2}) - 0.25 \ln_{5.1}{}^{2} m_{5} \dot{\theta}_{1} \sin(2.0 \theta_{2}) - 0.25 \ln_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \sin(2.0 \theta_{2}) + 0.5 \ln_{5.3}{}^{2} m_{5} \dot{\theta}_{2} \sin(2.0 \theta_{2}) + 0.5 \ln_{5.3}{}^{2} m_{5} \dot{
0.125\,a_3{}^2\,m_3\,\dot{\theta}_3\,\cos{(\theta_2)} + 0.5\,a_3{}^2\,m_4\,\dot{\theta}_3\,\cos{(\theta_2)} + 0.5\,a_3{}^2\,m_5\,\dot{\theta}_3\,\cos{(\theta_2)} + 0.125\,a_4{}^2\,m_4\,\dot{\theta}_3\,\cos{(\theta_2)} + 0.125\,a_4{}^2\,m_4\,\dot{\theta}_4\,\cos{(\theta_2)} + 0.125\,a_4{}^2\,m_4\,\dot{\theta}_4\,\cos{(\theta_2)
0.5\,a_4{}^2\,m_5\,\dot{\theta}_3\,\cos{(\theta_2)} + 0.5\,a_4{}^2\,m_5\,\dot{\theta}_4\,\cos{(\theta_2)} + 0.125\,a_5{}^2\,m_5\,\dot{\theta}_3\,\cos{(\theta_2)} + 0.125\,a_5{}^2\,m_5\,\dot{\theta}_4\,\cos{(\theta_2)} + 0.125\,a_5{}^2\,m_5\,\dot{\theta}_5\,\cos{(\theta_2)} + 0.125\,a_5{}^2\,m_5\,\dot{\theta}_5\,\cos{(\theta_2)
I_{yz,3} \dot{\theta}_3 \cos{(\theta_3)} \sin{(\theta_2)} + 0.5 \log_{11}{^2} m_3 \dot{\theta}_3 \cos{(\theta_2)} + 0.5 \log_{12}{^2} m_3 \dot{\theta}_3 \cos{(\theta_2)} + 0.5 \log_{11}{^2} m_4 \dot{\theta}_3 \cos{(\theta_2)} + 0.5 \log_{11}{^2} m_4 \dot{\theta}_4 \cos{(\theta_2)} + 0.5 \log_{11}
0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{3} \cos{(\theta_{2})} + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{4} \cos{(\theta_{2})} + 0.5 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2})} + 0.5 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{2})} + 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{2
0.5 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos(\theta_2) + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos(\theta_2) + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos(\theta_2) - I_{xz,3} \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{xz,3} \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos(\theta_2) + 0.5 \log_{5,2}{^2} m_5 \dot
0.5 I_{xx,4} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \sin(2.0 \theta_4) \cos(\theta_4) \cos
0.25 \log_{3,1}{}^2 m_3 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_2)} - 0.25 \log_{3,2}{}^2 m_3 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_2)} - I_{vz,4} \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} - I_{vz,4} \sin{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_3)} \cos{(2.0 
0.125 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, - \, 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \,
I_{xz,4}\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_3)\sin(\theta_4)-I_{xz,4}\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_4)\sin(\theta_3)-0.5\log_{3.1}{}^2m_3\dot{\theta}_3\cos(2.0\,\theta_3)\cos(\theta_2)+
0.5 \log_{3.2}{}^2 m_3 \dot{\theta}_3 \cos{(2.0 \,\theta_3)} \cos{(\theta_2)} + I_{\text{vz},4} \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} + 0.5 a_2 \log_{3.3}{m_2 \,\dot{\theta}_1} \cos{(2.0 \,\theta_2)} + a_2 \log_{3.3}{m_3 \,\dot{\theta}_1} \cos{(2.0 \,\theta_2)} + a_3 \log_{3.3}{m_3 \,\dot{\theta}_2} \cos{(2.0 \,\theta_2)} + a_4 \log_{3.3}{m_3 \,\dot{\theta}_3} \cos{(2.0 \,\theta_2)} + a_4 \log_{3
a_2 \log_{10} \log_{10} a_2 \log_{10} \log_{10} a_2 \log_
0.25 I_{yy,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_2)} - 0.5 a_2 \ln{\theta_2} m_2 \dot{\theta}_1 \sin{(2.0\,\theta_2)} - 0.25 a_3 \ln{\theta_3} m_3 \dot{\theta}_2 \sin{(2.0\,\theta_2)} - 0.25 a_3 \ln{\theta_3} m_3 \dot{\theta}_3 \sin{(2.0\,\theta_2)} + 0.25 a_3 \ln{\theta_3} m_3 \dot{\theta}_3 \sin{(2.0\,\theta_3)} + 0.25 a_3 
0.25 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} + 0.5 \, I_{\mathrm{xv}, 4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} + 0.00 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{
0.5 I_{xy,4} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} + 0.25 I_{xx,4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{yy,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{yy,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{yy,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.25 I_{yy,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_3
I_{vz,4} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - I_{vz,4} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - I_{xz,4} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - I_{xz,4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) - I_{xz,4} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - I_{xz,4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) - I_{xz,4} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - I_{xz,4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - I_{xz,4} \dot{\theta}_4 \cos(\theta_4) \cos(\theta
I_{xz,4}\dot{\theta}_4\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)-I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)+I_{yz,4}\dot{\theta}_3\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{yz,4}\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{yz,4}\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{yz,4}\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)
0.5 a_1 a_2 m_2 \dot{\theta}_1 \cos(\theta_2) + a_1 a_2 m_3 \dot{\theta}_1 \cos(\theta_2) + a_1 a_2 m_4 \dot{\theta}_1 \cos(\theta_2) + a_1 a_2 m_5 \dot{\theta}_1 \cos(\theta_2) + 0.5 I_{xx} 4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + a_1 a_2 m_5 \dot{\theta}_1 \cos(\theta_2) + a_1 a_2 m_5 \dot{\theta}_2 \cos(\theta_2) + a
0.5 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_
a_1 \log_{1.1} m_2 \dot{\theta}_1 \cos(\theta_2) + 0.5 a_3 \log_{1.1} m_3 \dot{\theta}_3 \cos(\theta_2) + 0.5 a_4 \log_{1.1} m_4 \dot{\theta}_3 \cos(\theta_2) + 0.5 a_4 \log_{1.1} m_4 \dot{\theta}_4 \cos(\theta_2) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \cos(\theta_2) + 0.5 \log_{1
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2) - I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) - I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_4) - I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_4) - I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta_5) 
I_{xy,4}\dot{\theta}_4\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) - I_{xy,4}\dot{\theta}_4\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) + a_1\log_{13}m_2\dot{\theta}_1\sin(\theta_2) + a_1\log_{13}m_3\dot{\theta}_1\sin(\theta_2) + a_1\log_{13}m_3\dot{\theta}_1\cos(\theta_2) + a_1\log_{13}m_3\dot{\theta}_1\cos(\theta_2) + a_1\log_{13}m_3\dot{\theta}_1\cos(\theta_2) + a_1\log_{13}m_3\dot{\theta}_1\cos(\theta_2) + a_1\log_{13}m_3\dot{
a_1 \log_{4.3} m_4 \dot{\theta}_1 \sin(\theta_2) + a_1 \log_{5.3} m_5 \dot{\theta}_1 \sin(\theta_2) + 0.0625 a_3^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.25 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.25 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.25 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.25 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.25 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) + 0.25 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_
0.25 \, a_3^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, I_{\text{vy},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_2)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 
0.25 a_3 lc_{3.1} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.25 a_3 \log_{10} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.25 a_3 \log_{10} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.25 a_3 \log_{10} m_3 \dot{\theta}_1 \sin(2.0 \theta_3) - I_{xz,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_3)
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0.5 \log_{1.1} \log_{1.2} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.
I_{vz.5}\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_3)}\cos{(\theta_4)}\sin{(\theta_5)} + I_{vz.5}\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_3)}\cos{(\theta_5)}\sin{(\theta_4)} + I_{vz.5}\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_4)}\sin{(\theta_5)} + I_{vz.5}\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_5)}\sin{(\theta_4)} + I_{vz.5}\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_5)}\sin{(\theta_5)} + I_{vz.5}\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos{(\theta_5)}\cos
0.5 I_{xx,5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + I_{xz,5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + I_{xz,5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} + I_{xz,5} \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_5)} + I_{xz,5} \dot{\theta}_3 \sin{(\theta_5)} + I_{xz,5} \dot{\theta}_4 \cos{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_5)} + I_{xz,5} \dot{\theta}_4 \cos{(2.0\,\theta_2)} \cos{(\theta_5)} + I_{xz,5} \dot{\theta}_4 \cos{(2.0\,\theta_5)} \cos{(\theta_5)} + I_{xz,5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \cos{(\theta_5)} + I_{xz,5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \cos{(\theta_5)} 
I_{xz,5}\dot{\theta}_1\cos(2.0\,\theta_2)\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) - I_{yz,5}\dot{\theta}_1\cos(2.0\,\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) - 0.5\,I_{xx,5}\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) - 0.5\,I_{xx,5}\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_5)\sin(\theta_5)
0.5 I_{xx.5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx.5} \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) +
0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.5 a_3 a_4 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + \log_{12} \log_{13} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) + I_{xv,5} \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + i \sin(2.0 \theta_5) \cos(\theta_4) + i \sin(2.0 \theta_5) \cos(\theta_5) + i \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5) + i \sin(2.0 \theta_5) \cos(\theta_
I_{xy.5}\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) + I_{xy.5}\dot{\theta}_3\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy.5}\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + I_{xy.5}\dot{\theta}_3\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin
I_{xy.5}\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) + I_{xy.5}\dot{\theta}_4\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy.5}\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + I_{xy.5}\dot{\theta}_5\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin
I_{\text{xv.5}}\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) + I_{\text{xv.5}}\dot{\theta}_5\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\cos(\theta_2) - a_2\,\mathrm{lc_{3.2}}\,m_3\,\dot{\theta}_1\sin(2.0\,\theta_2)\cos(\theta_3) + a_2\,\mathrm{lc_{3.2}}\,m_3\,\dot{\theta}_1\sin(2.0\,\theta_2)\cos(\theta_3) + a_3\,\mathrm{lc_{3.2}}\,m_3\,\dot{\theta}_1\sin(2.0\,\theta_2)\cos(\theta_3) + a_3\,\mathrm{lc_{3.2}}\,m_3\,\dot{\theta}_1\sin(2.0\,\theta_3)\cos(\theta_3) + a_3\,\mathrm{lc_{3.2}}\,m_3\,\dot{\theta}_1\sin(2.0\,\theta_3)\cos(\theta_3)\cos(\theta_3) + a_3\,\mathrm{lc_{3.2}}\,m_3\,\dot{\theta}_1\sin(2.0\,\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)\cos(\theta_3)
0.5 a_3 \log_{3.3} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 \log_{4.2} m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 \log_{4.2} m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \phi_3) \cos(2.0
a_3 \log_{10} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5)
0.5 \, a_2 \, a_3 \, m_3 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - a_2 \, a_3 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} - a_2 \, a_3 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_5 
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} + \log_{3.1} \log_{3.3} m_3 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} + \log_{3.2} m_3 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + \log_{3.2} m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} + \log_{3.2} m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos
lc_{3,1} lc_{3,2} m_3 \dot{\theta}_3 \sin{(2.0\,\theta_3)} \cos{(\theta_2)} + 0.5 I_{xx,5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{xx,5} \dot{\theta}_3 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{xx,5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} 
0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2
0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(
0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5
0.5 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 I_{\text{VV},5} \dot{\theta}_4 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{VV},5} \dot{\theta}_4 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{VV},5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{VV},5} \dot{\theta}_5 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
0.5 I_{\text{vv},5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{\text{vv},5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
a_2 \log_{1.1} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) + 0.5 a_3 \log_{1.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_4) + 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(\theta_5) + 0.5 a_5 \log_{1.1} m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3)
0.25 \, \text{lc}_{4.1}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} - 0.25 \, \text{lc}_{4.2}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} - I_{\text{xy}, 5} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - I_{\text{xy}, 5} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos
I_{xy,5} \dot{\theta}_4 \sin(2.0\,\theta_3) \sin(2.0\,\theta_4) \sin(2.0\,\theta_5) \cos(\theta_2) - I_{xy,5} \dot{\theta}_5 \sin(2.0\,\theta_3) \sin(2.0\,\theta_4) \sin(2.0\,\theta_5) \cos(\theta_2) - I_{xz,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - I_{xy,5} \dot{\theta}_5 \sin(2.0\,\theta_5) \sin(2.0\,\theta_5) \sin(2.0\,\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(2.0\,\theta_5) \cos(\theta_5) \cos(\theta_5
I_{xz,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)-I_{xz,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)-0.0625a_4^2m_4\dot{\theta}_1\sin(2.0\theta_2)\sin(2.0\theta_3)\sin(2.0\theta_4)-0.0625a_4^2m_4\dot{\theta}_1\sin(2.0\theta_2)\sin(2.0\theta_3)\sin(2.0\theta_4)
0.25 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + I_{vz.5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + I_{vz.5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + I_{vz.5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + I_{vz.5} \dot{\theta}_3 \cos(\theta_5) + I_{vz.5} \dot
I_{vz,5}\dot{\theta}_3\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)+I_{vz,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5)+I_{vz,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)+I_{vz,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)\sin(\theta_4)\sin(\theta_4)\sin(\theta_4)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5)\sin(\theta_5
I_{vz,5}\dot{\theta}_4\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)+I_{vz,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5)+I_{vz,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)+I_{vz,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)
I_{vz.5}\dot{\theta}_5\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3) - 0.25 lc_{4.1}{}^2m_4\dot{\theta}_1\sin(2.0\,\theta_2)\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) + 0.25 lc_{4.2}{}^2m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) + 0.25 lc_{4.2}{}^2m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) + 0.25 lc_{4.2}{}^2m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) + 0.25 lc_{4.2}{}^2m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin
I_{xz,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{xz,5}\dot{\theta}_3\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,5}\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)
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I_{xz,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_4\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{xz,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)+I_{xz,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_5)+I_{xz,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_5)
I_{xz,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)+I_{xz,5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_5)
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) - a_4 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) + a_5 \, a_5 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) + a_5 \, a_5
I_{yz,5} \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{yz,5} \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{yz,5} \dot{\theta}_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + I_{yz,5} \dot{\theta}_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - I_{yz,5} \dot{\theta}_5 \sin(\theta_4) \sin(\theta_5) + I_{yz,5} \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + I_{yz,5} \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + I_{yz,5} \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5
a_1 \log_{3.2} m_3 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) + a_2 \log_{3.2} m_3 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) + a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) + 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) + 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_5 \cos(\theta_3) + 0.5 a_3 \log_{4.1} m_5 \cos(\theta_3) + 0.5 a_3 \log_{4.1} m_5 \cos(\theta_3) + 0.5 a_3 \log_{4.1} m_5 \cos(\theta_3) + 0
a_4 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_5) - 0.5 a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) + 0.5 a_1 a_3 m_3 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 0.5 a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) + 0.5 a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) + 0.5 \log_{12} m_5 \dot{
a_1 a_3 m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_1 a_3 m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 0.5 a_2 a_3 m_3 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) + a_2 a_3 m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) + a_3 a_3 m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) + a_4 a_3 m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) + a_5 a_5 a_5 \cos(\theta_2) \sin(\theta_3) + a_5 a_5 a_5 \cos(\theta_2) \sin(\theta_3) + a_5 a_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) + a_5 a_5 \cos(\theta_3) \cos(
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.00 \, (0.0 \, \theta_4) \, \cos{(\theta_
0.5 a_4^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + a_1 lc_{3,1} m_3 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_2 lc_{3,1} m_3 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) - a_3 lc_{3,1} m_3 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3)
a_3 \log_{12} m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_4) - 0.5 a_3 \log_{12} m_4 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_4) - a_4 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_
0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_5) - 0.5 lc_{4,1}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 lc_{4,1}^2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 lc_{4,1}^2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 lc_{4,1}^2 m_4 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4)
0.5 \log_{4.2}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{4.2}^2 m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + \log_{3.2} \log_{3.3} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) + \log_{3.2} \log_{3.3} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + \log_{3.2} \log_{3.3} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + \log_{3.2} \log_{3.2} \log_{3.2} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + \log_{3.2} m_3 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + \log_{3.2} m_3 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3)
0.5 a_3 \log_{3.3} m_3 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) + a_3 \log_{4.3} m_4 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) + a_3 \log_{5.3} m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.125 a_4^2 m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.125 a_4^2 m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.125 a_4^2 m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_3) \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \sin(\theta_
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2
lc_{3,1}lc_{3,3}m_3\dot{\theta}_3\sin(\theta_2)\sin(\theta_3)+0.5lc_{4,1}^2m_4\dot{\theta}_3\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2)+0.5lc_{4,1}^2m_4\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2)-0.5lc_{4,1}^2m_4\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2)
0.5 \, \text{lc}_{4.2}{}^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{4.2}{}^2 \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_3 \, \text{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \,
0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{2})}\,\sin{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{2})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{2}\,\sin{(2.0\,\theta_{5})} + 0.0625\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{3}\,\sin{(2.0\,\theta_{5})} + 0.0626\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{3}\,\sin{(2.0\,\theta_{5})} + 0.0626\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{3}\,\sin{(2.0\,\theta_{5})} + 0.0626\,a_{5}{}^{2}\,m_{5}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_
0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 a_3 a_4 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.5 a_3 a_4 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4)
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) - 0.5 \, a_5 \, 
a_3 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.00 cos(\theta_4) \cos(2.0 \theta_5) \cos(\theta_4) \cos(2.0 \theta_5) \cos
0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 \cos(2.0 \theta_5) \cos(
lc_{4,2}lc_{4,3}m_4\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_3)}\cos{(\theta_4)} - a_2lc_{4,2}m_4\dot{\theta}_1\sin{(2.0\,\theta_2)}\cos{(\theta_3)}\cos{(\theta_4)} + a_3lc_{4,2}m_4\dot{\theta}_3\cos{(2.0\,\theta_3)}\cos{(\theta_2)}\sin{(\theta_4)} + a_3lc_{4,2}m_4\dot{\theta}_3\cos{(2.0\,\theta_3)}\cos{(\theta_4)} + a_3lc_{4,2}m_4\dot{\theta}_3\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta
a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(2.0 \theta_2) 
0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_2 \sin(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_3 \sin(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_4 \sin(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_5 \sin(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_5 \sin(\theta_5) \cos(\theta_5) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)
a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(2.0 \theta_2) \cos(\theta_4) \cos(\theta_
0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) - a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_3) \, \sin(\theta_4) - a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_4 \, a_4 \, a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_4 \, a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_4 \, a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + a_5 \, \dot{\theta}_2 \, \sin(\theta_3) + a_5 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos(\theta_3) + a_5 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos(\theta_3) + a_5 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos(\theta_3) + a_5 \, \dot
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, d\phi_4 \, d
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.25 \, a_5 \,
0.5 \log_{10} 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta
0.5 \log_{5.2}^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.1}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 
0.5 \log_{5.2}^{2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) +
lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\cos(2.0\theta_2)\cos(\theta_3)\sin(\theta_4)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\cos(2.0\theta_2)\cos(\theta_4)\sin(\theta_3)-a_2lc_{4,1}m_4\dot{\theta}_1\sin(2.0\theta_2)\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_1\sin(2.0\theta_2)\cos(\theta_3)\sin(\theta_4)
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a_2 \log_{10} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) + a_3 \log_{10} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_4 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
    0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)
    0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.
    0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
    0.125 a_5^2 m_5 \dot{\theta}_4 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_3)} \sin{(2.0 \theta_4)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_4)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(\theta_2)} - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos{(2.0 \theta_5)} \sin{(2.0 \theta_5)} \cos{(2.0 \theta
    0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
    lc_{4,2}lc_{4,3}m_4\dot{\theta}_1\cos(2.0\theta_2)\sin(\theta_3)\sin(\theta_4) + a_2lc_{4,2}m_4\dot{\theta}_1\sin(2.0\theta_2)\sin(\theta_3)\sin(\theta_4) - 0.5a_3lc_{5,2}m_5\dot{\theta}_1\sin(2.0\theta_2)\sin(\theta_4)\sin(\theta_5) - 0.5a_3lc_{5,2}m_5\dot{\theta}_1\sin(2.0\theta_2)\sin(\theta_4)\sin(\theta_5)
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
    0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)
    0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
    0.5 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{5.1}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
    0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,1}{}^2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)
    0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta
    0.5 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta
    0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
    0.25 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} \, - \, 0.25 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} \, - \, 0.25 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} \, - \, 0.25 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} \, - \, 0.25 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} \, - \, 0.25 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} \, - \, 0.25 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, 
    0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + a_1 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} + a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \mathrm{l
    a_2 \ln_{4,2} m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_3 \ln_{5,2} m_
    0.5 a_3 \log_{10} a_5 \log
    a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_1 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + 0.5 a_2 a_4 m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_4 a_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_5 a_5 a_5 \cos(\theta_4) \cos(\theta_3) \sin(\theta_4) + a_5 a_5 a_5 \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(
    0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) + 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_5 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 0.5 \, a_5 \, a
    a_2 a_4 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_2 a_4 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + a_2 a_4 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_3 a_4 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_3) + a_4 a_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + a_5 a_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_5 a_5 \dot{\theta}_5 \cos(\theta_5) 
    0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_5 \, a_5 \, a_5 \, a_5 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_5 \, a
    0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_4)} - 0.5 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} - 0.5 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
    0.25 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + a_1 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_1 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_1 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_1 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)}
    a_2 \ln_4 m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_2 \ln_4 m_4 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + a_2 \ln_4 m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_3 \ln_4 m_4 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_4) + a_3 \ln_4 m_4 \dot{\theta}_5 \cos(\theta_4) + a_3 \ln_4 m_4 \dot{\theta}_5 \cos(\theta_5) + a_3 \ln_4 m_4 \dot{\theta}_5 \cos(\theta_5) + a_3 \ln_4 m_5 \dot{\theta}_5 \cos(\theta_5) + a_3 \ln_4 m_5 \dot{\theta}_5 \cos(\theta_5) + a_3 \ln_5 m_5 \dot{\theta}_5 \cos(
    a_2 \log_{10} m_4 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5)
    0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d
    0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + lc_{4.2} lc_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.3} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - lc_{4.2} lc_{4.3} m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.3} m_4 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + lc_{4.2} lc_{4.3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + lc_{4.2} lc_{4.3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) + lc_{4.2} lc_{4.3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + lc_{4.2} lc_{4.3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \sin(\theta_4) + lc_{4.2} lc_{4.3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
    a_1 \ln a_2 + a_4 \ln a_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 \ln a_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_2 \ln a_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_4 \ln a_2 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - a_4 \ln a_4 \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_4 \ln a_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_4 \ln a_4 \cos(\theta
    0.5 a_4 lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_4 \cos(\theta_4) + 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_4
    0.5 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{
    a_4 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) + a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
    a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 0.5 a_3 \log_{3} 2 m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + \log_{4} \log_{4} \alpha_5 \cos(\theta_3) \sin(\theta_4) + \log_{4} \alpha_5 \cos(\theta_4) \sin(\theta_5) + \log_{4} \alpha_5 \cos(\theta_5) \cos(\theta_
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lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_2)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)+lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(\theta_3)+lc_{4,1}lc_{4,2}m_
lc_{4,2}lc_{4,3}m_4\dot{\theta}_3\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-0.5a_4lc_{4,1}m_4\dot{\theta}_3\cos(2.0\theta_3)\cos(2.0\theta_4)\cos(\theta_2)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_3\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_
0.5 a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.25 a_3 a_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \cos(\theta_4) + 0.5 a_3 a_4 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2
0.5 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, d_4 \, d_
0.5 a_4 lc_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) + 0.000 \cos(2.0 \theta_4) \cos(
lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\sin(2.0\,\theta_3
lc_{4,1}lc_{4,2}m_4\dot{\theta}_4\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2)-0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_2)\sin(\theta_4)-0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\sin(2.0\,\theta_2)\sin(2.0\,\theta_3)\cos(\theta_4)+0.5\,a_3\,lc_{4,2}m_4\dot{\theta}_1\sin(2.0\,\theta_3)\cos(\theta_4)
0.5 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) + 0.5 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_4) - 0.00 \, (\theta_4) \, \cos(\theta_4) \, \cos(\theta_4) \, \sin(\theta_4) \, \cos(\theta_4) \, \cos(\theta_4
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(\theta_4) - 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_2) + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_2) + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_2) + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \sin(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \cos(2.0
0.25 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{2}) + 0.25 a_{5} \log_{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \cos
0.25 a_5 \log_{10} a_5 
a_3 \log_{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{2} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \log_{3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \log_{3} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 \log_{3} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 a_5 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_5) + 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5 \log_{3} m_5
0.5 \, a_3 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, d_5 \, d_
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, d\phi_5 \, d\phi_
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, 
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \,
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_4) + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_2) \sin(2.0 \theta_3) + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos{(2.0\,\theta_2)}\cos{(\theta_3)}\cos{(\theta_4)}\cos{(\theta_5)} + 0.25\,a_5\,lc_{5,1}m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\sin{(2.0\,\theta_2)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)} + 0.25\,a_5\,lc_{5,1}m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.
0.25 a_5 \log_{10} 1 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 a_5 \log_{10} 1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 a_5 \log_{10} 1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 
a_{2} \ln_{5.1} m_{5} \dot{\theta}_{1} \sin(2.0 \theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{2}) \cos(\theta_{4}) \sin(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{4}) \sin(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{4}) \sin(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{5}) \sin(\theta_{4}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{5}) \sin(\theta_{5}) + a_{3} \ln_{5.1} m_{5} \dot{\theta}_{5} \sin(
a_3 lc_{5,1} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \phi_5) \cos(2.0 
0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, d
0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, 
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{3})\cos(\theta_{4})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{3})\cos(\theta_{5})\sin(\theta_{4})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{4})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{3})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5,2}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5,2}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5,2}\dot{\theta}_{1}\cos(2.0\,\theta_{2})\cos(\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5,2}\dot{\theta}_{1}\cos(2.0\,\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5,2}\dot{\theta}_{1}\cos(2.0\,\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,2}m_{5,2}\dot{\theta}_{1}\cos(2.0\,\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,2}m_{5,2}\dot{\theta}_{1}\cos(2.0\,\theta_{5})\sin(\theta_{5})-lc_{5,2}lc_{5,2}
0.25 a_5 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + a_2 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + a_2 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + a_4 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_4 \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) 
a_2 \ln a_2 \ln a_3 \ln a_3 \ln a_4 \ln a_4 \ln a_5 
a_3 \log_{10} a_5 \log_{10
0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)}
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 a_5 \log_{3.3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_3 \log_{3.2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{3.3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{3.3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{3.3} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{3.3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
0.5 a_3 \log_{10} a_5 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} a_5 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{10} a_5 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} a_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} a_5 \cos(\theta_5) 
0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 a_2 a_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 a_2 a_5 \dot{\theta}_3 \sin(\theta_5) + 0.
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) \, d\theta_5 \,
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - \log_{1.1} \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_2 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
a_2 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
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0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, d\phi_5 \,
lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(2.0\theta_2)\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)+0.5a_5lc_{5,1}m_5\dot{\theta}_3\cos(2.0\theta_3)\cos(2.0\theta_4)\cos(2.0\theta_5)\cos(\theta_2)+
0.5 a_5 lc_{5.1} m_5 \dot{\theta}_4 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \cos{(2.0 \theta_5)} \cos{(\theta_2)} + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \cos{(2.0 \theta_5)} \cos{(\theta_2)} - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_5)} \cos{(2.0 \theta_5)} \cos{(\theta_2)} + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_5)} \cos
a_2 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_4 \ln_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \cos(\theta_5) - 0.5 a_4 \ln_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \cos(2.0 \theta_3)
0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(
0.5 a_5 \log_2 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_
0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(2.0 \theta_
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_2) \sin(2.0 \, \theta_4) \cos(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \cos(2.0 \, \theta_4) \sin(2.0 \, \theta_3) \cos(\theta_5) +
0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - \log_{10} \log_{10} \log_{10} \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - \log_{10} \log_{10} \cos(\theta_5) \cos(\theta
lc_{5.1} lc_{5.2} m_5 \dot{\theta}_3 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - lc_{5.1} lc_{5.2} m_5 \dot{\theta}_3 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} - lc_{5.1} lc_{5.2} m_5 \dot{\theta}_3 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)
lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_4)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5
lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos(2.0\,\theta_5)\cos
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(\theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_5) \sin(2.0 \theta
0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_5) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 \log_{10} \theta_3 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.5 a_5 \log_{10} \frac{1}{1} \log_{10} \frac{1}
0.5 a_5 \log_{10} n_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} n_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(
0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
a_1 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos
a_2 \ln_{5,1} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_4 \ln_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_2) \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_4 \ln_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5)
0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
0.5 a_5 \log_2 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \cos(\theta_2) + 0.5 \log_2 m_5 \cos
0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_2 \sin(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_3 \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
a_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_1 \log_2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_2 m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) - a_4 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) - a_5 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
a_2 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_2 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \ln_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_2 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \ln_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos
a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) 
a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.25 a_4 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5 \log_3 
0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_1 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos
0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \cos(\theta_4) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_4) \, \sin(\theta_4) \, \cos(\theta_4) \, \cos
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)}
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lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_3)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_4\sin(2.0\,\theta_5)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_2) + lc_{5,2}lc_{5,2}m_5\dot{\theta}_5\cos(\theta_2) + lc_{5,2}lc_{5,2}m_5\dot
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 10 c_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5)
a_1 \ln a_1 \ln a_2 \ln a_3 \ln a_4 + a_4 \ln a_5 
a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5)
a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)
a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) 
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{3}\cos(\theta_{3})\cos(\theta_{4})\sin(\theta_{2})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{3}\cos(\theta_{3})\cos(\theta_{5})\sin(\theta_{2})\sin(\theta_{4})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{3}\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{2})\sin(\theta_{3})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{3}\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{3})\cos(\theta_{4})\sin(\theta_{2})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{3})\cos(\theta_{5})\sin(\theta_{2})\sin(\theta_{4})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{2})\sin(\theta_{2})\sin(\theta_{3})
a_1 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_2) \sin(\theta_3) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_
a_2 \ln a_2 \ln a_3 \ln a_4 \ln a_5 
0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(
0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
0.5 a_5 lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5)
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta
lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4) + a_4lc_{5,2}m_5\dot{\theta}_3\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_4)\cos(\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_4\cos(2.0\,\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta_5) + a_4lc_{5,2}m_5\dot{\theta}_5\cos(2.0\,\theta
0.5 a_4 \log_{10} a_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + 0.5 a_4 \log_{10} a_5 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} a_5 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} a_5 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 \log_{10} a_5 \cos(2.0 \theta_5) \cos
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_5 \, a
    0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) \, \cos(\theta_5) \, d\phi_5
    0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, d\phi_5 \, d
    0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_4) \cos(\theta_2) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_4) \sin(2.0 \, \theta_3) \cos(\theta_2) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_4) \sin(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_4) \sin(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_4) \sin(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \sin(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \cos(2.0 \, \theta_3) \cos(\theta_5) + 0.25 \, \dot{\theta}_5 \cos(2.0 \, \theta_5) + 0.25 \, \dot{\theta}_5 
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_
0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{
a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos
a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(\theta_5) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(\theta_5) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(\theta_5) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta
a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2
0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) - 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 a_4 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
    0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_2) \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \cos(2.
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} 
0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} 
a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(
a_4 \ln a_5 = a_5 + a_5 
a_4 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_5) \cos(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) 
0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0
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 $0.5\,a_4\,l_{c_{5,2}}\,m_5\,\dot{\theta}_5\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)}\,\cos{(\theta_2)}\,\cos{(\theta_5)} - 0.5\,a_4\,a_5\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)}\,\sin{(\theta_5)} - 0.5\,a_4\,a_5\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)}\,\sin{(\theta_5)} + 0.5\,a_3\,l_{c_{5,2}}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)}\,\sin{(\theta_5)} + 0.5\,a_3\,l_{c_{5,2}}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} + 0.5\,a_3\,l_{c_{5,2}}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} + 0.5\,a_3\,l_{c_{5,2}}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} + 0.5\,a_3\,l_{c_{5,1}}\,m_5\,\dot{\theta}_3\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)}\,\sin{(\theta_5)} - 0.25\,a_3\,l_{c_{5,1}}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)}\,\sin{(\theta_5)} + 0.25\,a_3\,l_{c_{5,1}}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_4)}\,\sin{(\theta_5)} + 0.25\,a_3\,l_{c_{5,1}}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_5\,l_{c_{5,1}}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_2)}$

(A33)

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C_{22} = 2.0 I_{xy,4} \dot{\theta}_3 \cos(\theta_3)^2 - I_{xy,4} \dot{\theta}_4 - I_{xy,5} \dot{\theta}_3 - I_{xy,5} \dot{\theta}_4 - I_{xy,5} \dot{\theta}_5 - I_{xy,4} \dot{\theta}_3 + 2.0 I_{xy,4} \dot{\theta}_3 \cos(\theta_4)^2 +
2.0 I_{xy,4} \dot{\theta}_4 \cos{(\theta_3)^2} + 2 I_{xy,5} \dot{\theta}_3 \cos{(\theta_3)^2} + 2.0 I_{xy,4} \dot{\theta}_4 \cos{(\theta_4)^2} + 2 I_{xy,5} \dot{\theta}_3 \cos{(\theta_4)^2} + 2 I_{xy,5} \dot{\theta}_4 \cos{(\theta_3)^2} + 2 I_{xy,5} \dot{\theta}_3 \cos{(\theta_5)^2} + 2 I_{xy,5} \dot{\theta}_4 \cos{(\theta_5)^2} + 2 I_{xy,5} \dot{\theta}_5 \cos{(\theta_5)
2I_{xy.5}\dot{\theta}_4\cos(\theta_4)^2 + 2I_{xy.5}\dot{\theta}_5\cos(\theta_3)^2 + 2I_{xy.5}\dot{\theta}_4\cos(\theta_5)^2 + 2I_{xy.5}\dot{\theta}_5\cos(\theta_4)^2 + 2I_{xy.5}\dot{\theta}_5\cos(\theta_5)^2 - I_{xy.3}\dot{\theta}_3\cos(2.0\,\theta_3) - I_{xy.5}\dot{\theta}_5\cos(\theta_5)^2 + 2I_{xy.5}\dot{\theta}_5\cos(\theta_5)^2 + 2I_{xy.5}\dot{\theta}_5\cos
0.5 I_{\text{XX}} \stackrel{?}{_{3}} \dot{\theta}_{3} \sin{(2.0 \, \theta_{3})} + 0.5 I_{\text{XY}} \stackrel{?}{_{3}} \dot{\theta}_{3} \sin{(2.0 \, \theta_{3})} + 0.5 \, a_{4} \, \text{lc}_{4} \stackrel{?}{_{2}} \, m_{4} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \text{lc}_{5} \stackrel{?}{_{2}} \, m_{5} \, \dot{\theta}_{3} + 0.5 \, a_{5} \, \dot{\theta}_{3} + 
0.5 a_5 \log_2 m_5 \dot{\theta}_5 + \log_4 \log_4 \theta_3 + \log_4 \log_4 \theta_4 + \log_5 \log_2 m_5 \dot{\theta}_3 + \log_5 \log_4 \theta_4 + \log_5 \log_2 m_5 \dot{\theta}_5 + \log_5 \log_4 \theta_5 + \log_5 \log_5 \theta_5 + \log_5 \theta_5 +
0.125 \, a_3^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} - 4.0 \, I_{xy,4} \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 1.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 1.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.0 \, i_{xy,4} \, \dot{\theta}_3 \, \sin{(2.0 \, \theta
4.0 I_{xy,4} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4 I_{xy,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4 I_{xy,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5)^2 - 4 I_{xy,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4 I_{xy,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4 I_{xy,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4 I_{xy,5} \dot{\theta}_5 \cos(\theta_5)^2 - 4 I_{
4I_{xy.5}\dot{\theta}_3\cos(\theta_4)^2\cos(\theta_5)^2-4I_{xy.5}\dot{\theta}_4\cos(\theta_3)^2\cos(\theta_5)^2-4I_{xy.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_4)^2-4I_{xy.5}\dot{\theta}_4\cos(\theta_4)^2\cos(\theta_5)^2-4I_{xy.5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_4)^2\cos(\theta_5)^2
4I_{xy,5}\dot{\theta}_5\cos(\theta_3)^2\cos(\theta_5)^2-4I_{xy,5}\dot{\theta}_5\cos(\theta_4)^2\cos(\theta_5)^2+0.5lc_{3,1}^2m_3\dot{\theta}_3\sin(2.0\theta_3)-0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta_3)+0.5lc_{3,2}^2m_3\dot{\theta}_3\sin(2.0\theta
I_{xx,4}\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)+I_{xx,4}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)+I_{xx,4}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_3)+I_{xx,5}\dot{\theta}_5\cos(\theta_3
I_{xx} \stackrel{\downarrow}{} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + I_{xx} \stackrel{\downarrow}{} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5)
I_{xx.5}\dot{\theta}_5\cos(\theta_4)\sin(\theta_4)+I_{xx.5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_5)+I_{xx.5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_5)-I_{yy.4}\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)-I_{yy.4}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)-I_{yy.4}\dot{\theta}_4\cos(\theta_3)\sin(\theta_3)
I_{\text{vv},5}\,\dot{\theta}_3\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) - I_{\text{vv},4}\,\dot{\theta}_3\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_4\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) - I_{\text{vv},4}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_3\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},6}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},7}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},9}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},9}\,\dot{\theta}_4\,\cos\left(\theta_4\right) + I_{\text{vv},9}\,\dot{\theta}_4\,
I_{\text{vv},5}\,\dot{\theta}_5\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) - I_{\text{vv},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_3\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - I_{\text{vv},5}\,\dot{\theta}_5\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_4\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - I_{\text{vv},5}\,\dot{\theta}_5\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_5\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - I_{\text{vv},5}\,\dot{\theta}_5\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - I_{\text{vv},5}\,\dot{\theta}_5\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - I_{\text{vv},5}\,\dot{\theta}_5\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - I_{\text{vv},5}\,\dot{\theta}
I_{\text{yy},5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{xx},4} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{xx},4} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{xx},4} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{xx},4} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{xx},4} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_
2.0 I_{\text{xx},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{xx},4} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{xx},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{xx},6} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{xx},6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{xx},6} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{xx},6} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{\text{xx},6} \dot{\theta}_5 \cos(\theta_5) \cos(
2.0 I_{xx} = 5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xx} = 5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{xx} = 5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 2.0 i_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 i_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) + 2.0 i_
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2.0 I_{xx.5} \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx.5} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{xx.5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx.5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta
2.0 I_{xx,5} \dot{\theta}_4 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 I_{xx,5} \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 2.0 I_{xx,5} \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} -
2.0 I_{xx} = \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{yy} = \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{yy} = \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{yy} = \dot{\theta}_5 \cos(\theta_4)^2 \sin(\theta_5) + 2.0 I_{yy} = \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{yy} = \dot{\theta}
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2.0 I_{\text{vv.}5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{\text{vv.}5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{\text{vv.}5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{\text{vv.}5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3
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2.0 I_{\text{VV}} = 5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{\text{VV}} = 
2.0 I_{\text{VV}} = 5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{VV}} = 5 \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{\text{
2.0 \, I_{\text{vv}, 5} \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, I_{\text{vv}, 5} \, \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)}^2 - a_4 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \cos{(\theta_4)
a_4 \log_{12} m_4 \dot{\theta}_4 \cos(\theta_3)^2 - a_4 \log_{12} m_4 \dot{\theta}_4 \cos(\theta_4)^2 - a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_3)^2 - a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4)^2 - a_5 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_3)^2 - a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3)^2 
a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)^2} - a_5 \ln_{5,2} m_5 \dot{\theta}_4 \cos{(\theta_4)^2} - a_5 \ln_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} - a_5 \ln_{5,2} m_5 \dot{\theta}_4 \cos{(\theta_5)^2} - a_5 \ln_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_4)^2} - a_5 \ln_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_
a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 - 2 \log_4 \log_4 \theta_3 \cos(\theta_3)^2 - 2 \log_4 \log_4 \theta_3 \cos(\theta_4)^2 - 2 \log_4 \log_4 \theta_4 \cos(\theta_3)^2 - 2 \log_4 \theta_5 \cos(\theta_4)^2 - 2 \log_4 \theta_5 \cos(\theta_5)^2 - 2 \log_5 \theta
2 \operatorname{lc}_{41} \operatorname{lc}_{42} m_4 \dot{\theta}_4 \cos(\theta_4)^2 - 2.0 \operatorname{lc}_{51} \operatorname{lc}_{52} m_5 \dot{\theta}_3 \cos(\theta_3)^2 - 2.0 \operatorname{lc}_{51} \operatorname{lc}_{52} m_5 \dot{\theta}_3 \cos(\theta_4)^2 - 2.0 \operatorname{lc}_{51} \operatorname{lc}_{52} m_5 \dot{\theta}_4 \cos(\theta_3)^2 -
2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_3 \cos{(\theta_5)}^2 - 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_4 \cos{(\theta_4)}^2 - 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_5 \cos{(\theta_3)}^2 - 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_4 \cos{(\theta_5)}^2 - 2.0 \log_{5.1} \log_{5.2} m_5 \,\dot{\theta}_5 \cos{(\theta_5)}^2 - 2.0 \log_{5.2} \log_{5.2} m_5 \,\dot{\theta}
2.0 \log_{1.1} \log_{1.2} m_5 \,\dot{\theta}_5 \cos{(\theta_4)}^2 - 2.0 \log_{1.1} \log_{1.2} m_5 \,\dot{\theta}_5 \cos{(\theta_5)}^2 + 0.5 \,a_3 \log_{1.2} m_3 \,\dot{\theta}_3 \cos{(2.0 \,\theta_3)} + \log_{1.1} \log_{1.2} m_3 \,\dot{\theta}_3 \cos{(2.0 \,\theta_3)} + \log_{1.1} \log_{1.2} m_5 \,\dot{\theta}_5 \cos{(\theta_5)}^2 + 0.5 \,a_3 \log_{1.2} m_3 \,\dot{\theta}_3 \cos{(2.0 \,\theta_3)} + \log_{1.2} \log_{1.2} m_5 \,\dot{\theta}_5 \cos{(\theta_5)}^2 + 0.5 \,a_3 \log_{1.2} m_3 \,\dot{\theta}_3 \cos{(2.0 \,\theta_3)} + \log_{1.2} \log_{1.2} m_5 \,\dot{\theta}_5 \cos{(\theta_5)}^2 + 0.5 \,a_3 \log_{1.
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0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) - a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, d\phi_3 
0.25 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - a_4^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} 
a_4^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - a_4^2 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) - 0.25 a_5^2 m_5 \dot{
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0.25 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 8 I_{xy,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 8 I_{xy,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 8 I_{xy,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 8 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 8 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 8 I_{xy,5} \dot{\theta}_5 \cos(\theta_5)^2 + 8 I
8I_{xy.5}\dot{\theta}_5\cos{(\theta_3)}^2\cos{(\theta_4)}^2\cos{(\theta_5)}^2 - \ln_{4.1}^2 m_4\dot{\theta}_3\cos{(\theta_3)}\sin{(\theta_3)} - \ln_{4.1}^2 m_4\dot{\theta}_4\cos{(\theta_3)}\sin{(\theta_3)} + \ln_{4.2}^2 m_4\dot{\theta}_3\cos{(\theta_3)}\sin{(\theta_3)} - \ln_{4.2}^2 m_4\dot{\theta}_3\cos{(\theta_3)}\sin{(\theta_3)} + \ln_{4.2}^2 m_4\dot{\theta}_3\cos{(\theta_3)}\cos{(\theta_3)}\sin{(\theta_3)} + \ln_{4.2}^2 m_4\dot{\theta}_3\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)}\cos{(\theta_3)
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{\log_{5,2}}^2 m_5 \dot{\theta}_4 \cos{(\theta_4)} \sin{(\theta_4)} - {\log_{5,1}}^2 m_5 \dot{\theta}_4 \cos{(\theta_5)} \sin{(\theta_5)} + {\log_{5,2}}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} + {\log_{5,2}}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} - {\log_{5,2}}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + {\log_{5,2}}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + {\log_{5,2}}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + {\log_{5,2}}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + {\log_{5,2}}^2 m_5 \dot{\theta}_5 
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0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} - a_2 \, \mathrm{lc}_{3.2} \, m_3 \, \dot{\theta}_3 \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} + a_4 \, \cos{(\theta_4)} + a_4
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2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 \log_{4.2}^2 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 2.0 \log_{4.1}^2 m_4 \dot{\theta}_4 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(
2.0 \log_{4,2}^{2} m_{4} \dot{\theta}_{3} \cos(\theta_{3})^{2} \cos(\theta_{4}) \sin(\theta_{4}) - 2.0 \log_{4,2}^{2} m_{4} \dot{\theta}_{4} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) - 2.0 \log_{4,2}^{2} m_{4} \dot{\theta}_{4} \cos(\theta_{3})^{2} \cos(\theta_{4}) \sin(\theta_{4}) + 2.0 \log_{4,2}^{2} m_{4} \dot{\theta}_{4} \cos(\theta_{4}) + 2.0 \log_{4,2}^{2} m_{4} \dot{\theta}_{4} \cos(\theta_{4}) + 2.0 \log_{4,2}^{2} m_{4} \dot{\theta}_{4} \cos(\theta_{4}) + 2.0 \log_{4,2}^{2} m_{4} \dot{\theta}
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2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})} \cos{(\theta_{4})^{2}} \sin{(\theta_{3})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})} \cos{(\theta_{5})^{2}} \sin{(\theta_{3})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} 
2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \sin{(\theta_{4})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})} \cos{(\theta_{4})^{2}} \sin{(\theta_{3})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(
2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,1}{}^2 \sin(\theta_5) + 2.0 \log_{5,1}{}^2 \sin(\theta_5) + 2.0 \log_{5,1}{}^2 \sin(\theta_5) + 2.0 \log_{5,1}{}^2 \cos(\theta_5) 
2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})} \cos{(
2.0 \log_{5.1}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5.1}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \log_{5.1}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5.1}{}^2 \sin{(\theta_5)} + 2.0 \log_{5.1}{}^2 \sin{(\theta_5)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_5)} \cos{
2.0 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_5)^2} \sin{(\theta_3)} - 2.0 \log_{5,2}{^2} \cos{(\theta_5)^2} \sin{(\theta_5)} - 2.0 \log_{5,2}{^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} - 2.0 \log_{5,2}{^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} - 2.0 \log_{5,2}{^2} \cos{(\theta_5)^2} \cos{(\theta_5)
2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{4})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})} \cos{(\theta_{5})
2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \log_{5,2}{}^2 \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 \cos{(\theta_5)} 
2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 2.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 2.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 2.0 \log_{5,2}{}^2 \cos{(\theta_5)} 
2.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{^2} m_5
4.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2
4.0 I_{xx.5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx.5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xx.5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{xx.5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{xx.5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5
4.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,
4.0 I_{vv,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{vv,5} \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{vv,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{vv,5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) - 4.0 I_{vv,5} \dot{\theta}_5 
4.0 I_{\text{vv},5} \dot{\theta}_3 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 4.0 I_{\text{vv},5} \dot{\theta}_4 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_3)} - 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)} - 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)^2} - 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos{
4.0 I_{yy,5} \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{yy,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{yy,5} \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{yy,
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a_3 \ln_4 2 m_4 \theta_3 \cos(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \ln_4 2 m_4 \theta_4 \cos(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 a_4 m_4 \theta_3 \cos(2.0 \theta_3) \sin(\theta_4) + 0.5 a_5 \ln_4 2 m_4 \theta_5 \cos(2.0 \theta_5) \sin(\theta_4) + 0.5 a_5 \ln_4 2 m_4 \theta_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) \sin
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(2.
a_3 \log_{10} a_4 \log_{10} a_5 \cos(2.0 \theta_3) \sin(\theta_4) + a_3 \log_{10} a_5 \sin(2.0 \theta_3) \cos(\theta_4) + 0.5 a_3 \log_{10} a_5 \log(2.0 \theta_3) \sin(\theta_4) + a_5 \log_{10} a_5 \log(2.0 \theta_3) \cos(\theta_4) + 0.5 \log_{10} a_5 \log(2.0 \theta_3) \sin(\theta_4) + a_5 \log_{10} a_5 \log(2.0 \theta_3) \cos(\theta_4) + 0.5 \log_{10} a_5 \log(2.0 \theta_3) \sin(\theta_4) + a_5 \log_{10} a_5 \log(2.0 \theta_3) \cos(\theta_4) + 0.5 \log_{10} a_5 \log(2.0 \theta_3) \sin(\theta_4) + a_5 \log_{10} a_5 \log(2.0 \theta_3) \cos(\theta_4) + 0.5 \log_{10} a_5 \log(2.0 \theta_3) \sin(\theta_4) + a_5 \log(2.0 \theta_3) \cos(\theta_4) + 0.5 \log(2.0 \theta_4) \cos(\theta_4) \cos(\theta_4)
0.5 a_3 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) + 2.0 a_4 \log_{10} m_4 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 a_4 \log_{10} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 a_4 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4)^2 + 2.0 a_4 \log_{10} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4)^2 + 2.0 a_4 \log_{10} m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 a_4 \log_{10} m_4 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
2.0 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_3)
2.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 
2.0 a_5 \log_2 m_5 \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 a_5 \log_2 m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 \log_2 \log_2 m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 \log_2 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 2.0 \log_2 m_5 \dot{\theta}_5
a_3 \log_{12} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(\theta_4) - 0.5 a_3 \log_{12} m_4 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(\theta_4) + 4 \log_{12} m_4 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4)^2 +
4 \operatorname{lc}_{4.1} \operatorname{lc}_{4.2} m_4 \dot{\theta}_4 \cos (\theta_3)^2 \cos (\theta_4)^2 + 4.0 \operatorname{lc}_{5.1} \operatorname{lc}_{5.2} m_5 \dot{\theta}_3 \cos (\theta_3)^2 \cos (\theta_4)^2 + 4.0 \operatorname{lc}_{5.1} \operatorname{lc}_{5.2} m_5 \dot{\theta}_3 \cos (\theta_3)^2 \cos (\theta_5)^2 +
4.0 \log_{11} \log_{22} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 + 4.0 \log_{11} \log_{22} m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{11} \log_{12} m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5)^2 +
4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_4 \cos{(\theta_4)^2} \cos{(\theta_5)^2} + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 4.0 \log_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 4.0 \log_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_5)^2} + 4.0 \log_{5,2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} + 4.0 \log_{5,2} m_5 \dot{\theta}_
4.0 \log_{10} \log_{
4I_{xy.5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+4I_{xy.5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+4I_{xy.5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_5)\sin(\theta_5)+
4I_{xy,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4) + 4I_{xy,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5) + 4I_{xy,5}\dot{\theta}_3\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5) + 4I_{xy,5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_5) + 4I_{xy,5}\dot{\theta}_5\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\sin(\theta_5) + 4I_{xy,5}\dot{\theta}_5\cos
4I_{xy,5}\dot{\theta}_5\cos\left(\theta_3\right)\cos\left(\theta_5\right)\sin\left(\theta_3\right)\sin\left(\theta_5\right) + 4I_{xy,5}\dot{\theta}_4\cos\left(\theta_4\right)\cos\left(\theta_5\right)\sin\left(\theta_4\right)\sin\left(\theta_5\right) + 4I_{xy,5}\dot{\theta}_5\cos\left(\theta_4\right)\cos\left(\theta_5\right)\sin\left(\theta_5\right) + 4I_{xy,5}\dot{\theta}_5\cos\left(\theta_5\right)\sin\left(\theta_5\right) + 4I
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + a_2 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)} + a_2 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} - a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + a_4 \, \mathrm{lc}_{4,1} \, m_5 
0.5 a_3 \log_{1.1} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \log_{1.1} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) - a_2 \log_{1.2} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_2 \log_{1.2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) - a_2 \log_{1.2} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - a_2 \log_{1.2} m_4 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - a_2 \log_{1.2} m_4 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4
a_4 \ln_4 m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - a_2 \ln_4 m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - a_2 \ln_4 m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - a_4 \ln_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(
a_4 lc_{4,1} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - a_4 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_
a_5 \ln 1 + m_5 + 
a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_4) - a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{10} m_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5)
a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_4) - a_5 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_4 m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) - a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_4 m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) - a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_5 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_4) \, \sin(\theta_5) - a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \sin(\theta_3) \, \sin(\theta_4) - a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5.1} \, 
0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_4) \sin(\theta_5) + 0.5 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_5) \cos(\theta
0.5 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.0 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.0 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4)^2 \sin(\theta_3) + 0.0 a_4^2 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4)
2.0 \, a_4^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta
2.0 \, a_4^2 \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \cos{(\theta_5
0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5^2 m_5
0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}
0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2
0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 
0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos
a_4 \ln a_5 = a_5 + a_5 \ln a_5 + a_5 \ln a_5 \ln a_5 + a_5 \ln a_5
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2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_4)}
2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5)
2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos
2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \cos{(\theta_4)} \cos{(\theta_5)} \cos{(
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 
2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)} \cos{(\theta_5)}
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) - a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5)^2 \, \sin(\theta_3) - a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) - a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) - a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) - a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) - a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5)^2 
a_{5}^{2} m_{5} \dot{\theta}_{4} \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) - a_{5}^{2} m_{5} \dot{\theta}_{3} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{5}) - a_{5}^{2} m_{5} \dot{\theta}_{4} \cos (\theta_{3})^{2} \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{4}) - a_{5}^{2} m_{5} \dot{\theta}_{4} \cos (\theta_{5})^{2} \sin (\theta_{5}) - a_{5}^{2} m_{5} \dot{\theta}_{4} \cos (\theta_{5})^{2} \sin (\theta_{5}) - a_{5}^{2} m_{5} \dot{\theta}_{5} \cos (\theta_{5})^{2} \sin (\theta_{5}) - a_{5}^{2} m_{5}^{2} \dot{\theta}_{5} \cos (\theta_{5})^{2} \sin (\theta_{5}) + a_{5}^{2} m_{5}^{2} \dot{\theta}_{5} 
a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) - a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) - a_5^2 m_5 \dot{\theta}_5 \cos
a_5^2 m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^{2} \, \cos{(\theta_5)}^{2} \, \sin{(\theta_3)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^{2} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^{2} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^{2} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^{2} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^{2} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^{2} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_5)}^{2} \, \sin{(\theta_4)} + 4.0 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)}^{2} \, \sin{(\theta_5)}^{2} \, \sin{(\theta_5)
4.0 \log_{5.1}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 \log_{5.2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} - 4.0 \log_{5.1}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \log_{5.1}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \log_{5.1}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \log_{5.1}{}^2 \cos{(\theta_5)} 
4.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} - 4.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{3})} + 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} + 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \sin{(
4.0 \log_{5,2}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} - 4.0 \log_{5,1}{}^2 m_5 \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 4.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 4.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \log_{5,1}{}^2 m_5 \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \log_{5,1}{}^2 \sin{(\theta_5)} - 4.0 \log_{5,1}{}^2 \sin{(\theta_5)} - 4.0 \log_{5,1}{}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \log_{5,1}{}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2
4.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 4.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{4} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 4.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} - 4.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + 4.0 \log_{5,2}{}^{2} m_{5} \dot{\theta}_{5} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + 4.0 \log_{5,2}{}^{2} \sin{(\theta_{5})} + 4.
4.0 \log_{5,1}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \log_{5,2}{^2} m_5 \dot{\theta}_4 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 4.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 4.0 \log_{5,2}{^2} m_5 \dot{\theta}_5 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2}
4.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \log_{5} 2 m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{4}) \sin(\theta_{5}) - a_{3} \log_{5} 2 m_{5} \dot{\theta}_{3} \cos(2.0 \theta_{3}) \cos(\theta_{5}) \sin(\theta_{4}) - a_{5} \log_{5} 2 m_{5} \dot{\theta}_{5} \cos(\theta_{5}) \sin(\theta_{5}) - a_{5} \log_{5} 2 m_{5} \dot{\theta}_{5} \cos
a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos
0.5 a_3 \log_{12} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \phi_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \phi_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \phi_5) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \phi
0.5 \, a_3 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \cos{(\theta_5)} + 
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 \, \dot{\theta}_
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \,
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} \, d
a_3 \ln 1_{5,1} + m_5 + \hat{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \ln 1_{5,1} + m_5 + \hat{\theta}_4 \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \ln 1_{5,1} + m_5 + \hat{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5 \sin(\theta_5) - 0.5 a_5 \ln 1_{5,1} + m_5 + \hat{\theta}_5
0.5 a_3 lc_{5.1} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.
0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \sin(\theta_5) 
0.5 a_3 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_2 \log_2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_2 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - a_2 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) - a_2 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) - a_3 \log_2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_
0.5 a_2 a_5 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_2 lc_{5.1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 lc_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_4) - a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_2 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
a_2 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_
a_2 \ln 1 = a_2 \ln 1 = a_2 \ln 1 = a_3 \ln 1 = a_4 \ln 1 = a_5 \ln 1 = a_5
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4.0 a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_2 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + a_5 \log_{12}
a_2 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) 
a_2 \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) +
0.5 a_2 a_5 m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{10} \log_{10} \log_{10} (\theta_5) - 8.0 \log_{10} \log_{10} (\theta_5) \cos(\theta_5)^2 - 8.0 \log_{10} \log_{10} (\theta_5) \cos(\theta_5)^2 - 8.0 \log_{10} (\theta_5) \cos(\theta_5)^2 - 8.0 \log_{10} (\theta_5) \cos(\theta_5)^2 \cos(\theta_5)^2 - 8.0 \log_{10} (\theta_5) \cos(\theta_5)^2 \cos(\theta_
8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_2 \log_{5.1} m_5 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{5.1} m_5 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_2 \log_{5.1} m_5 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{5.1} m_5 \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + a_3 \log_{5.1} m_5 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + a_3 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + a_3 \log_{5.1} m_5 \dot{\theta}_5 \sin(\theta_5) + a_3 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + a_3 \log_{5.1} m_5 \dot{\theta}
a_2 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_4 a_5 m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_5 \sin(\theta_5) \sin(\theta_5) \cos(2.0 \theta_5) \cos(
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_3) \, \sin(\theta_4) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 8 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5
8I_{xy,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)^2\sin(\theta_3)\sin(\theta_4) - 8I_{xy,5}\dot{\theta}_3\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5) - 8I_{xy,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_3)\sin(\theta_5) - 8I_{xy,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)
8I_{xy.5}\dot{\theta}_5\cos\left(\theta_3\right)\cos\left(\theta_4\right)\cos\left(\theta_5\right)^2\sin\left(\theta_3\right)\sin\left(\theta_4\right) - 8I_{xy.5}\dot{\theta}_4\cos\left(\theta_3\right)^2\cos\left(\theta_4\right)\cos\left(\theta_5\right)\sin\left(\theta_4\right)\sin\left(\theta_5\right) - 8I_{xy.5}\dot{\theta}_5\cos\left(\theta_3\right)\cos\left(\theta_4\right)^2\cos\left(\theta_5\right)\sin\left(\theta_3\right)\sin\left(\theta_5\right) - 8I_{xy.5}\dot{\theta}_5\cos\left(\theta_5\right)\sin\left(\theta_5\right)\sin\left(\theta_5\right) - 8I_{xy.5}\dot{\theta}_5\cos\left(\theta_5\right)\sin\left(\theta_5\right) - 8I_{xy.5}\dot
8I_{xy} = \dot{\theta}_5 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + a_4 \ln \theta_5 \cos(2.0\theta_3) \cos(2.0\theta_4) \cos(\theta_5) + a_4 \ln \theta_5 \cos(2.0\theta_3) \cos(2.0\theta_4) \cos(\theta_5) + a_4 \ln \theta_5 \cos(2.0\theta_5) 
0.5 a_4 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \cos(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5.2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) - a_4 lc_{5.
a_4 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 
a_4 \log_{12} m_5 \dot{\theta}_4 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \cos{(\theta_5)} - 0.5 \, a_4 \log_{12} m_5 \dot{\theta}_5 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(\theta_5)} - 0.5 \, a_4 \log_{12} m_5 \dot{\theta}_5 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2.0\,
0.5 \, a_4 \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(2.0 \,
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} 
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{
a_4 \ln 1_{5,1} + m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \ln 1_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \ln 1_5 \sin(\theta_5) - a_4 \ln 1_5 \sin(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(
a_4 \log_{10} m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_4 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_4 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_4 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_4 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) - 0.5 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_
0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos
4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{
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2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4 \, \mathrm{lc}_{4,2} \, \mathrm{lc}_{4,3} \, \mathrm{lc}_{4,4} \, \mathrm{
4.0 \log_{10} \log_{
4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2
4.0 \log_{10} \log_{
a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_5^2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
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a_{5}^{2}m_{5}\dot{\theta}_{5}\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5}) + 4.0 \log_{1,2}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5}) + 4.0 \log_{1,2}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{3})\sin(\theta_{4}) + 4.0 \log_{1,2}^{2}m_{5}\dot{\theta}_{3}\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{3})\sin(\theta_{5}) + 4.0 \log_
```

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C_{23} = I_{xz,3}\dot{\theta}_3\sin(\theta_3) - I_{xy,3}\dot{\theta}_2\cos(2.0\,\theta_3) - 0.5\,I_{xx,3}\dot{\theta}_2\sin(2.0\,\theta_3) + 0.5\,I_{yy,3}\dot{\theta}_2\sin(2.0\,\theta_3) + I_{yz,3}\dot{\theta}_3\cos(\theta_3) + I_{yz,3}\dot{\theta}_3\sin(2.0\,\theta_3) + I_{yz,3}\dot{\theta}_3\cos(\theta_3) + I_{yz,3}\dot{\theta}_3\sin(2.0\,\theta_3) + I_{yz,3}\dot{\theta}_3
0.5 I_{zz,3} \dot{\theta}_1 \cos(\theta_2) + 0.5 I_{zz,4} \dot{\theta}_1 \cos(\theta_2) + 0.5 I_{zz,5} \dot{\theta}_1 \cos(\theta_2) - I_{xy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{xy,4} \dot{\theta}_3 \cos(2.0 \theta_4) - 0.5 I_{xy,4} \dot{\theta}_4 \cos(2.0 \theta_4) - 0.5
0.5 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) +
I_{xy,4}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) + 0.5\,I_{xx,3}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(\theta_2) - 0.5\,I_{yy,3}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(\theta_2) - I_{xy,3}\dot{\theta}_1\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy,4}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) + 0.5\,I_{xx,3}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(\theta_2) - 0.5\,I_{yy,3}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(\theta_2) - I_{xy,3}\dot{\theta}_1\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy,4}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy,4}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy,4}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy,4}\dot{\theta}_2\sin(2.0\,\theta_3)\cos(\theta_2) + I_{xy,4}\dot{
0.125 \, a_3^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} - 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.1}}^2 \, m_3 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, \mathrm{lc_{3.
0.5 \log_{3.2}{}^2 m_3 \dot{\theta}_2 \sin(2.0 \theta_3) + I_{vz,4} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) + I_{vz,4} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) + 0.125 a_3^2 m_3 \dot{\theta}_1 \cos(\theta_2) + 0.5 a_3^2 m_4 \dot{\theta}_2 \sin(\theta_2) + 0.5 a_3^2 m_4 \dot{\theta}_2 \sin(\theta_2) + 0.5 a_3^2 m_4 \dot{\theta}_2 \sin(\theta_2) + 0.5 a_3^2 m_4 \dot{\theta}_2 \cos(\theta_2) + 0.5 a_3^2 m_4 \dot{\theta}
0.5\,a_3{}^2\,m_5\,\dot{\theta}_1\,\cos{(\theta_2)} + 0.125\,a_4{}^2\,m_4\,\dot{\theta}_1\,\cos{(\theta_2)} + 0.5\,a_4{}^2\,m_5\,\dot{\theta}_1\,\cos{(\theta_2)} + 0.125\,a_5{}^2\,m_5\,\dot{\theta}_1\,\cos{(\theta_2)} + I_{xz,4}\,\dot{\theta}_3\,\cos{(\theta_3)}\,\sin{(\theta_4)} + I_{xz,4}\,\dot{\theta}_3\,\cos{(\theta_5)} + I_{xz,4}\,\dot{\theta}_
I_{xz,4}\dot{\theta}_3\cos(\theta_4)\sin(\theta_3) + I_{xz,4}\dot{\theta}_4\cos(\theta_3)\sin(\theta_4) + I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_3) - I_{yz,3}\dot{\theta}_1\cos(\theta_3)\sin(\theta_2) + 0.5\ln_{3,1}^2m_3\dot{\theta}_1\cos(\theta_2) + 0.5\ln_{3,1}^2m_3\dot{\theta}_1\cos(\theta_2)
0.5 \log_{3.2}{}^2 m_3 \dot{\theta}_1 \cos{(\theta_2)} + 0.5 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} + 0.5 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} + 0.5 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} + 0.5 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_2)} + 0.5 \log_{5.2}{}^2 m_5 \dot{\theta}_3 \cos{(
I_{xz,3} \dot{\theta}_1 \sin{(\theta_2)} \sin{(\theta_3)} - I_{yz,4} \dot{\theta}_3 \sin{(\theta_3)} \sin{(\theta_4)} - I_{yz,4} \dot{\theta}_4 \sin{(\theta_3)} \sin{(\theta_4)} - l_{c_{3,1}} l_{c_{3,3}} m_3 \dot{\theta}_3 \sin{(\theta_3)} - 0.5 I_{xx,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 I_{xx,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(\theta_3)} \cos{(\theta_3)} 
0.5 I_{\text{vv},4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 \log_{10} \frac{1}{2} m_4 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0
0.5 \log_{4.2}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 \log_{4.2}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.125 a_3^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 \log_{4.2}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2)
0.5 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 a_3^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 \log_{10}^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{10}^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{10}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(
I_{xy,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5) + 0.5\,a_3\,l_{c_{3,2}}\,m_3\dot{\theta}_2\cos(2.0\,\theta_3) + l_{c_{3,1}}\,l_{c_{3,2}}\,m_3\dot{\theta}_2\cos(2.0\,\theta_3) + 0.5\,I_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.5\,a_3\,l_{c_{3,2}}\,m_3\dot{\theta}_2\cos(2.0\,\theta_3) + 0.5\,I_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.5\,a_3\,l_{c_{3,2}}\,m_3\dot{\theta}_2\cos(2.0\,\theta_3) + 0.5\,I_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.5\,a_3\,l_{c_{3,2}}\,m_3\dot{\theta}_2\cos(2.0\,\theta_3) + 0.5\,l_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.5\,l_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.5\,l_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5) + 0.5\,l_{xx,5}\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3
0.5 I_{xx,5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.5 I_{xx,5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.5 I_{yy,5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.5 I_{yy,5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.5 I_{yy,5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.5 I_{yy,5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.5 a_3 \ln_{3.1} m_3 \dot{\theta}_2 \sin{(2.0\,\theta_3)} - 0.5 a_3 \ln_{3.1} m_3 \dot{\theta}_2 \sin{(2.0\,\theta_3)} + 0.5 a_3 \ln_{3.1} m_3 \dot{\theta}_2 \sin{(2.0\,\theta_3)} - 0.5 a_3 \ln_{3.1} m_3 \dot{\theta}_2 \sin{(2.0\,\theta_3)} + 0.5 a_3 \ln_{3.1} m_3 \dot{\theta}_3 \sin{(2.0\,\theta_3)} + 0.5 a_3 \ln_{3.1} m_3 \dot{\theta}_3
I_{xv,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - I_{xv,5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - I_{xv,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + I_{xv,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0
I_{xz,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + I_{xz,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + I_{xz,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) - 0.5I_{xx,5}\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5) + I_{xz,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + I_{xz,5}\dot{\theta}_3\cos(\theta_5) + I_{xz,5}\dot{\theta}_3\cos(\theta_5
0.5 I_{\text{vv},5} \dot{\theta}_2 \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_4) \sin(2.0 \,\theta_5) - I_{\text{vz},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - I_{\text{vz},6} \dot{\theta}_3 \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_4) \sin(2.0 \,\theta_5) - I_{\text{vz},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - I_{\text{vz},6} \dot{\theta}_3 \cos(\theta_5) \cos(\theta
I_{\text{vz},5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-I_{\text{vz},5}\dot{\theta}_3\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)-I_{\text{vz},5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-I_{\text{vz},5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-I_{\text{vz},5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_5)
I_{vz,5}\dot{\theta}_4\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)-I_{vz,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-I_{vz,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-I_{vz,5}\dot{\theta}_5\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)-I_{vz,5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_5)
I_{xz,4}\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)-I_{xz,4}\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)-I_{xz,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)
I_{xz,5}\dot{\theta}_3\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{xz,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)-I_{xz,5}\dot{\theta}_4\cos(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_4\cos(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_4)-I_{xz,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_5)
I_{xz,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) - I_{xz,5}\dot{\theta}_5\cos(\theta_4)\sin(\theta_3)\sin(\theta_5) - I_{xz,5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) + I_{yz,4}\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)\sin(\theta_4) + I_{yz,4}\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)\sin(\theta_4) + I_{yz,5}\dot{\theta}_2\cos(\theta_3)\sin(\theta_4) + I_{yz,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_4) + I_{yz,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)\sin(\theta_4) + I_{yz,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) + I_{yz,6}\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_4) + I_{yz,6}\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)\sin(\theta_3) + I_{yz,6}\dot{\theta}_3\cos(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin(\theta_3)\sin
I_{vz.5}\dot{\theta}_3\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + I_{vz.5}\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + I_{vz.5}\dot{\theta}_5\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.5a_2a_3m_3\dot{\theta}_2\cos(\theta_3) + 0.5a_2a_3m_3\dot{\theta}_2\cos(\theta_3)
a_2 a_3 m_4 \dot{\theta}_2 \cos(\theta_3) + a_2 a_3 m_5 \dot{\theta}_2 \cos(\theta_3) + 0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0
0.5 \, a_3 \, \lg_{3,1} \, m_3 \, \dot{\theta}_1 \, \cos{(\theta_2)} + a_2 \, \lg_{3,1} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} + 0.5 \, a_4 \, \lg_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - \lg_{3,2} \, \lg_{3,3} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} - \lg_{3,2} \, \lg_{3,3} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_4 \, \lg_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - \lg_{3,2} \, \lg_{3,3} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_4 \, \lg_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} + 0.5 \, a_5 \, g_5 \, \dot{\theta}_3 \, d_5 \, \dot{\theta}_3 \, d_5 \, \dot{\theta}_3 \, d_5 \, \dot{\theta}_3 \, d_5 \, \dot{\theta}_3 \, d
I_{xy,4}\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) - I_{xy,4}\dot{\theta}_1\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) - a_2\log_{3,2}m_3\dot{\theta}_2\sin(\theta_3) - 0.5\,a_3\log_{3,3}m_3\dot{\theta}_3\sin(\theta_3) - 0.5\,a_3\log_{3,3}m_3\dot{\theta}_3\sin(\theta_3)
a_3 \log_{10} a_4 \log_{10} a_3 \log_{10} a_4 \log_{10} \log_{10} a_4 \log_{10} \log_{10} a_4 \log_{10} \log_{10} a_4 \log_{10} a_4 \log_{10} a_4 \log_{10} a_4 \log_{10} a_4 \log_{10}
0.5 a_4^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 1 c_{4,1} 1 c_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 1 c_{4,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 1 c_{4,3} c_{4,4} c_{4
0.5 a_4 \log_{10} a_4 \log
lc_{4,1}lc_{4,2}m_4\dot{\theta}_2\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) - 0.5I_{xx,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) - 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_5)\cos(\theta_2) + 0.5I_{yy,5}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0\,\theta_3)\cos(2.0
0.5 \, a_3 \, \mathrm{lc}_{3\,1} \, m_3 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.0 \, a_4 \, a_4
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + I_{xy,5} \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2) + a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(
I_{xy.5}\dot{\theta}_1\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)}+I_{xy.5}\dot{\theta}_1\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,\dot{\theta}_1\sin{(2.0\,\theta_3)}\cos{(\theta_2)}+0.5\,a_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.2}\,m_3\,l_{3.
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a_3 \log_{11} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) + a_3 \log_{11} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} + \log_{3.1} \log_{3.2} m_3 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \cos{(\theta_2)} + \log_{3.2} m_3 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} 
0.5 I_{xx.5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) +
0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_
a_3 lc_{4,2} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(\theta_4)} - 0.5 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.5 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} - 0.5 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.5 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} - 0.5 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_
0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \,\theta_{4})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{3})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{4})} \sin{(2.0 \,\theta_{5})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})}
0.5 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - I_{xy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - I_{xz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + I_{xy,5} \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
0.125 a_5^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + I_{vz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + I_{vz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + I_{vz,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_5) + I_{vz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + I_{vz,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + I_{vz,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + I_{vz,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + I_{vz,5} \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + I_{vz,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) +
I_{\text{vz},5}\,\dot{\theta}_{1}\,\cos{(\theta_{4})}\,\cos{(\theta_{5})}\,\sin{(\theta_{2})}\,\sin{(\theta_{3})} + 0.5\,\text{lc}_{5,1}{}^{2}\,m_{5}\,\dot{\theta}_{2}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} - 0.5\,\text{lc}_{5,2}{}^{2}\,m_{5}\,\dot{\theta}_{2}\,\sin{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 0.5\,\text{lc}_{5,2}{}^{2}\,m_{5}\,\dot{\theta}_{2}\,\sin{(2.0\,\theta_{5})} + 0.5\,\text{lc}_{5,2}{}^{2}\,m_{5}\,\dot{\theta}_{2}\,\dot{\theta}_{2}\,\dot{\theta}_{2}\,\dot{\theta}_{2}\,\dot{\theta}_{2}\,\dot{\theta}_{2}\,\dot{\theta}_{2}\,\dot{\theta}_
I_{xz,5}\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{xz,5}\dot{\theta}_1\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+I_{xz,5}\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) + 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) + a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) - a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) + a_4 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_4) + a_5 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_4) + a_5 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_4) + a_5 \, a_5 \, a_5 \, \cos(\theta_5) 
I_{\text{vz},5} \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \ln_{3,2} m_3 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) + a_3 \ln_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) + a_2 \ln_{4,1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) - a_3 \ln_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_3 \ln_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) + a_3 \ln_{4,1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) - a_3 \ln_{4,1} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + a_3 \ln_{4,1} m_4 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_4) + a_3 \ln_{4,1} m_4 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) + a_3 \ln_{4,1} m_4 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_
a_4 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) + 0.5 a_2 a_3 m_3 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_2 a_3 m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_2 a_3 m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) - a_2 a_3 m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_3 a_3 a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_3 a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_3 a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_4 a_5 a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_5 a_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) + a_5 a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + a_5 a_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + a_5 a_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 a_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) + a_5 a_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.00 \, a_4^2 \, a_5 \, a_5^2 \, a_
lc_{4,2}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)-lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)+a_2lc_{3,1}m_3\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)-a_3lc_{4,2}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_4)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)-a_3lc_{4,2}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)-a_3lc_{4,3}m_4\dot{\theta}_1\cos(\theta_
a_2 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) - a_2 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_3) - 0.5 a_4 \log_{13} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - 0.5 a_4 \log_{13} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) - 0.5 a_4 \log_{13} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) - 0.5 a_4 \log_{13} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4 \log_{13} m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 0.5 a_4 \log_{13} m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta
0.5 a_4 lc_{4,3} m_4 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - 0.5 a_4 lc_{4,3} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_5) - a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) - a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) - a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) - a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) - a_5 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) - a_5 lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) - a_5 lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) - a_5 lc_{5,
a_4 \log_{3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - a_4 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_3) - a_4 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_3) - a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos
a_2 a_4 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) - 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0
lc_{3,2}lc_{3,3}m_3\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_3)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_3)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)-lc_{4,1}lc_{4,2}m_4\dot{\theta}_3\cos(\theta_4)\cos(\theta_4)
lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_4)\sin(\theta_3)+0.5a_3lc_{3,3}m_3\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4,3}m_4\dot{\theta}_1\sin(\theta_3)+a_3lc_{4
a_3 \log_{3.3} m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos
lc_{3,1}lc_{3,3}m_3\dot{\theta}_1\sin(\theta_2)\sin(\theta_3)+lc_{4,2}lc_{4,3}m_4\dot{\theta}_3\sin(\theta_3)\sin(\theta_4)+lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)+0.5lc_{4,1}^2m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2)-1.00
0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 \log_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + a_4 \log_{5.2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{4.2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \cos(\theta_5) - a_4 \, a_5 \, 
a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \theta_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} + a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_5^{\, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_5^{\, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.125 \, a_5^{\, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} 
a_3 \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + a_3 \log_{12} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - a_3 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)}
a_3 \log_{10} a_4 \log_{10} a_4 \log_{10} a_5 \log_{10
a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2) + a_3 \log_{10}(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_{10}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - a_3 \log_{10}(2.0 \theta_5) \sin(2.0 \theta_5
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} +
0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(
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0.5 \log_{2} {}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{3})} \sin{(2.0 \,\theta_{4})} \cos{(\theta_{2})} - 0.5 a_{5} \log_{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{4})} \cos{(2.0 \,\theta_{5})} - 0.5 a_{5} \log_{2} m_{5} \dot{\theta}_{2} \cos{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})}
lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5) - 0.5\,a_5\,lc_{5,1}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\sin(2.0\,\theta_5) - 0.5\,a_5\,lc_{5,1}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4) + 0.5\,a_5\,lc_{5,1}m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_5)
0.5\,a_5\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5,2}\,m_5
0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + a_2 \log_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_3 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_4) + a_3 \log_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - a_3 \log_4 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) - a_3 \log_4 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(2.0 \theta_4) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_5 \log_{10} m_5 \cos(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_5 \log_{10} m_5
0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos
a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_3 a_5 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_4 \, a_5 
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} 
lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(2.0\,\theta_5)\sin(2.0\,\theta_3)\sin(2.0\,\theta_4) - lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) - lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) - lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)
lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + 0.5a_5lc_{5,1}m_5\dot{\theta}_2\sin(2.0\theta_3)\sin(2.0\theta_4)\sin(2.0\theta_5) + a_2lc_{4,1}m_4\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_2\sin(2.0\theta_3)\sin(2.0\theta_3)\sin(2.0\theta_5) + a_3lc_{4,1}m_4\dot{\theta}_1\cos(\theta_3)\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_2\sin(2.0\theta_3)\sin(2.0\theta_3)\sin(2.0\theta_3)\sin(2.0\theta_5) + a_3lc_{4,1}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\sin(\theta_4) + a_3lc_{4,1}m_5\dot{\theta}_3\sin(\theta_5) + a_3lc_{4,1}m_5\dot{\theta}_3\cos(\theta_5) + a_3lc_{4,1}m_5\dot{\theta}_
a_2 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - a_3 \log_{11} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_3 \log_{11} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5
a_2 \ln a_1 \ln a_2 \ln a_3 \ln a_4 \ln a_5 + a_2 \ln a_5 
lc_{4,2}lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)+lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)+lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)+lc_{5,2}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_4)
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{3}\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{3})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{3})\cos(\theta_{4})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{4})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\cos(\theta_{5})\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5,2}m_{5}\dot{\theta}_{5}\sin(\theta_{5})+lc_{5,2}lc_{5,3}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_{5,2}m_
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{3})-a_{2}lc_{4,2}m_{4}\dot{\theta}_{1}\cos(\theta_{2})\sin(\theta_{3})\sin(\theta_{4})+0.5a_{4}lc_{4,3}m_{4}\dot{\theta}_{1}\cos(\theta_{3})\sin(\theta_{2})\sin(\theta_{4})+0.5a_{5,4}lc_{5,4}m_{5,4}\dot{\theta}_{1}\cos(\theta_{2})\sin(\theta_{3})\sin(\theta_{4})
0.5 a_4 \ln a_4 \ln a_4 + \ln a_5 \ln a_4 \ln a_5 + \ln a_5 \ln a_
a_4 \ln 3 = a_5 
a_2 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta
0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_
0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + \log_{10} \log_{10} m_5 \dot{\theta}_2 \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)+lc_{5,1}lc_{
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_4)\sin(\theta_5)\sin(\theta_5)
lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+a_2lc_{5,1}m_5\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+o.5a_4a_5m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5)-o.5a_4a_5m_5\dot{\theta}_2\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_5)
lc_{4} = lc_{4} = m_{4} \dot{\theta}_{1} \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) - lc_{5} = lc_{5} = m_{5} \dot{\theta}_{3} \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - lc_{5} = lc_{5} = m_{5} \dot{\theta}_{4} \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - lc_{5} = lc_{5} = m_{5} \dot{\theta}_{4} \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - lc_{5} = lc_{5} = m_{5} \dot{\theta}_{4} \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - lc_{5} = lc_{5} = m_{5} \dot{\theta}_{4} \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - lc_{5} = lc_{5} = lc_{5} = m_{5} \dot{\theta}_{4} \sin(\theta_{5}) \sin(\theta_{5}) - lc_{5} = lc_{5} =
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + a_4 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + a_4 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.0 
0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) - a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5)
a_4 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_5) - 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - a_4 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - a_4 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - a_4 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - a_4 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 
lc_{4,1}lc_{4,2}m_4\dot{\theta}_1\cos{(2.0\,\theta_4)}\sin{(2.0\,\theta_3)}\cos{(\theta_2)} + 0.5\,a_4\,lc_{4,1}m_4\dot{\theta}_1\sin{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)} - a_4\,lc_{5,1}m_5\dot{\theta}_2\cos{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(\theta_5)} - a_4\,lc_{5,1}m_5\dot{\theta}_2\cos{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_4)
a_4 \ln a_5 
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \cos
a_3 \ln \ln m_5 = \frac{1}{2} \ln m_5
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a_{3} \ln \log_{12} m_{5} \dot{\theta}_{1} \cos(2.0 \, \theta_{3}) \cos(\theta_{2}) \sin(\theta_{4}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{2}) \cos(\theta_{4}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{2}) \cos(\theta_{4}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{2}) \cos(\theta_{5}) \sin(\theta_{4}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(2.0 \, \theta_{3}) \cos(\theta_{5}) \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{2} \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{1} \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{2} \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{3} \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{2} \sin(\theta_{5}) - a_{3} \ln_{5,2} m_{5} \dot{\theta}_{3} \sin(\theta_{5}) - a_{3} \ln
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, \mathrm{l
0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta
0.5 a_5 \log_2 a_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)}-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)}-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_3)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_5\,lc_{5,1}\,m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.0\,\theta_5)}\cos{(2.
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) 
a_{2} \ln_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \sin(\theta_{5}) - a_{2} \ln_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{5}) \sin(\theta_{4}) - a_{2} \ln_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{4}) \sin(\theta_{5}) + a_{2} \ln_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{5}) \sin(\theta_{4}) - a_{2} \ln_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) + a_{3} \ln_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) + a_{4} \ln_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) + a_{5} \ln_{5} 2 m_{5} \dot{\theta}_{2} \sin(\theta_{5}) + a_{5} \ln_{5} 2 m_{5} \dot{\theta}_{2} \sin
0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5
0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + \ln_{5,1} \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + \ln_{5,1} \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + \ln_{5,1} \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_4) + \ln_{5,1} \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_4) + \ln_{5,1} \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_4) + \ln_{5,1} \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.
\log_{10} 
a_2 \ln \log a_1 + \log a_2 \ln a_3 + \log a_4 + 
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(\theta_{4})\cos(\theta_{5})\sin(\theta_{2})\sin(\theta_{3}) + a_{2}lc_{5,2}m_{5}\dot{\theta}_{1}\cos(\theta_{2})\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5}) - 0.5a_{5}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(\theta_{3})\sin(\theta_{2})\sin(\theta_{4})\sin(\theta_{5}) - 0.5a_{5}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(\theta_{5})\sin(\theta_{2})\sin(\theta_{4})\sin(\theta_{5}) - 0.5a_{5}lc_{5,3}m_{5}\dot{\theta}_{1}\cos(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(\theta_{5})\sin(
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - a_5 lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) \, d\phi_3 \, d\phi_4 \, d\phi_5 \, d\phi_6 \, d\phi_6
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0
a_4 \ln 1_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) - a_4 \ln 1_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) + a_4 \ln 1_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5) \cos(
a_4 \ln \log a_5 = 2 
a_4 \ln a_5 = a_5 + a_5 + a_5 = a_5 + a_5 = a_5 + a_5 = a_5 
a_4 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (A35)
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```
C_{24} = 2.0 I_{xy,4} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_2 - I_{xy,4} \dot{\theta}_2 + 2.0 I_{xy,4} \dot{\theta}_2 \cos(\theta_4)^2 + 2 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 + 2 I_{xy,5} \dot{\theta}_2 \cos(\theta_4)^2 + 2 I_{xy,5} \dot{\theta}_2 \cos(\theta_4
2I_{xy.5}\dot{\theta}_2\cos(\theta_5)^2 + 0.5I_{zz.4}\dot{\theta}_1\cos(\theta_2) + 0.5I_{zz.5}\dot{\theta}_1\cos(\theta_2) + 0.5a_4l_{c_{4.2}}m_4\dot{\theta}_2 + 0.5a_5l_{c_{5.2}}m_5\dot{\theta}_2 + l_{c_{4.1}}l_{c_{4.2}}m_4\dot{\theta}_2 + 0.5a_5l_{c_{5.2}}m_5\dot{\theta}_2 
    lc_{5,1}lc_{5,2}m_5\dot{\theta}_2-4.0I_{xy,4}\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_4)^2-4I_{xy,5}\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_4)^2-4I_{xy,5}\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_5)^2-4I_{xy,5}\dot{\theta}_2\cos(\theta_4)^2+4I_{xy,5}\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos(\theta_3)^2\cos
I_{yz,4}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4) + I_{yz,4}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4) + 0.125\,a_4^2\,m_4\dot{\theta}_1\cos(\theta_2) + 0.5\,a_4^2\,m_5\dot{\theta}_1\cos(\theta_2) + 0.125\,a_5^2\,m_5\dot{\theta}_1\cos(\theta_2) + 0.125\,a_5^2\,m_5\dot{\theta}_1\cos(\theta_2)
I_{\text{xx},4}\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)+I_{\text{xx},5}\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)+I_{\text{xx},4}\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},5}\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},4}\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)+I_{\text{xx},4}\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)+I_{\text{xx},4}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text{xx},6}\dot{\theta}_3\cos(\theta_4)\sin(\theta_4)+I_{\text
I_{xz,4}\dot{\theta}_3\cos(\theta_4)\sin(\theta_3)+I_{xx,5}\dot{\theta}_2\cos(\theta_5)\sin(\theta_5)+I_{xz,4}\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)+I_{xz,4}\dot{\theta}_4\cos(\theta_4)\sin(\theta_3)-I_{yy,4}\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-I_{yy,4}\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)
I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_1 \cos(\theta_2) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.5 \ln_{4,1}^2 \sin(\theta_4) + 0.5 \ln_{4,1}^2 \sin(\theta
0.5 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - I_{\text{vz},4} \, \dot{\theta}_3 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - I_{\text{vz},4} \, \dot{\theta}_4 \, \sin{(\theta_4)} + I_{\text{vz},4} \, \dot{\theta}_4
0.5 I_{xx,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 2.0 I_{xx,4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_2) + 0.0 I_{yy,4} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_
2.0 I_{xx} + \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xx} + \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{xx} + \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{xx} + \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{xx} + \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx} + \dot{\theta}_3 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx} + \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx} + \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx} + \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 
2.0 I_{xx} = 5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xx} = 5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{xx} = 5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx} = 6 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx} = 6 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
2.0 I_{\text{xx},5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{yy},4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{\text{yy},4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{yy},4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 2.0 I_{\text{yy},4} \dot{\theta}_2 \cos(\theta_4)^2 \sin(\theta_4) + 2.0 I_{\text{yy},4} \dot{\theta}_2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \cos
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) + 2
a_4 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_3)^2 - a_4 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_4)^2 - a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3)^2 - a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4)^2 - a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5)^2 
2 \log_{4,1} \log_{4,2} m_4 \dot{\theta}_2 \cos(\theta_3)^2 - 2 \log_{4,1} \log_{4,2} m_4 \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 \log_{5,1} \log_
2.0 \log_{10} \log_{
I_{vz,4}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)-I_{vz,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-I_{vz,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_5)\sin(\theta_4)-I_{vz,5}\dot{\theta}_3\cos(\theta_4)\cos(\theta_5)\sin(\theta_3)-I_{vz,5}\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)
I_{vz,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - I_{vz,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - I_{vz,5} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - I_{vz,5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - I_{vz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - I_{vz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta
0.25 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.25 \, a_5^2 \, m_5 \, \dot{
0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - I_{xz.4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - I_{xz.4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) - I_{xz.4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) - I_{xz.4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) - I_{xz.4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_1 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_3 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_2 \cos(\theta_5)^2 - I_{xz.4} \dot{\theta}_3 \cos(\theta_5) + 8 I_{xv.5} \dot{\theta}_3 \cos(\theta_5) + 8 I_{xv.5}
I_{xz,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-I_{xz,5}\dot{\theta}_3\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{xz,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)
I_{xz,5}\dot{\theta}_4\cos(\theta_4)\sin(\theta_3)\sin(\theta_5) - I_{xz,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_3)\sin(\theta_4) - I_{xz,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_4)\sin(\theta_5) - I_{xz,5}\dot{\theta}_5\cos(\theta_4)\sin(\theta_5) - I_{xz,5}\dot{\theta}_5\cos(\theta_4)\sin(\theta_5)
I_{xz,5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-lc_{4,1}{}^2m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{4,1}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{4,1}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{4,1}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{4,1}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-lc_{4,1}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-lc_{4,1}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)+lc_{4,2}{}^2m_4\dot{\theta}_2\cos(\theta_4)+lc_{4,2}{}^2m_4\dot{
{\rm lc}_{4,2}{}^2\,m_4\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} - {\rm lc}_{5,1}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_3)}\,\sin{(\theta_3)} + {\rm lc}_{5,2}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_3)}\,\sin{(\theta_3)} - {\rm lc}_{5,1}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} + {\rm lc}_{5,2}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_3)}\,\sin{(\theta_3)} - {\rm lc}_{5,1}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} + {\rm lc}_{5,2}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_3)}\,\sin{(\theta_3)} - {\rm lc}_{5,1}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} + {\rm lc}_{5,2}{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} + {\rm lc}_{5,2}{}^2\,m_5\,\dot{\theta}_2\,
\log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - \log_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + I_{vz,4} \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + I_{vz,4} \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + \log_{5,2
I_{vz,5}\dot{\theta}_3\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + I_{vz,5}\dot{\theta}_4\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + I_{vz,5}\dot{\theta}_5\sin(\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.5I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_2) - 0.5I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_3)\sin(\theta_4)\sin(\theta_5) + 0.5I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(\theta_2) - 0.5I_{xx,4}\dot{\theta}_1\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_3)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_4)\cos(2.0\,\theta_
0.5 I_{\text{vv},4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 a_4 \ln{(a_1)} m_4 \dot{\theta}_1 \cos{(\theta_2)} - 0.5 a_3 \ln{(a_2)} m_4 \dot{\theta}_2 \cos{(\theta_4)} + 0.5 a_5 \ln{(a_2)} m_5 \dot{\theta}_1 \cos{(\theta_2)} - 0.5 a_5 \ln{(a_2)} m_4 \dot{\theta}_2 \cos{(\theta_4)} + 0.5 a_5 \ln{(a_2)} m_5 \dot{\theta}_1 \cos{(\theta_2)} - 0.5 a_5 \ln{(a_2)} m_5 \dot{\theta}_1 \cos{(\theta_2)} + 0.5 a_5 \ln{(a_2)} m_5 \dot{\theta}_2 \cos{(\theta_4)} + 0.5 a_5 \ln{(a_2)} m_5 \dot{\theta}_1 \cos{(\theta_2)} + 0.5 a_5 \ln{(a_2)} m_5 \dot{\theta}_2 \cos{(\theta_2)} + 0.5 a_5 \ln{(a_2)} m_5 \dot{\theta}_3 \cos{(\theta_2
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - I_{\text{xv},4} \, \dot{\theta}_2 \, \sin{(\theta_3)} \, \cos{(\theta_2)} + I_{\text{xv},4} \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_2)} + I_{\text{xv},4} \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_3
0.5 a_3 lc_{4,1} m_4 \dot{\theta}_2 \sin(\theta_4) + 2.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 10.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 10.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_4) + 10.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_4) + 10.0 lc_{4,1}^2 m_4 \dot{\theta}_2 
2.0 \log_{4,2}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 2.0 \log_{4,2}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{1,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \log_{1,2}{}^2 \sin{(\theta_3)} + 2.0 \log_{1,2}{}^2 \cos{(\theta_4)} 
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \sin{(\theta_{4})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{4})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{3})} \cos{(\theta_{4})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{3})} \cos{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{3})} \cos{(\theta_{3})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{3})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{3})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})} \cos{(\theta_{3})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})} \cos{(\theta_{3})} \cos{(\theta_{3})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos{(\theta_{3})} \cos{(\theta_{3})} \cos{(\theta_{3})} \sin{(\theta_{3})} + 2.0 \log_{5.2}^{2} m_
2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) - 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{4}) \sin(\theta_{4}) + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{4}) + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 2.0 \log_{5} 2^{2} \cos(\theta_{5}) + 2.0 
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \sin{
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2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + 4.0 I_{xx,5} \dot{\theta}_{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) + 4.0 I_{xx,5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) + 4.0 I_{xx,5} \dot{\theta}_{4} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 4.0 I_{xx,5} \dot{\theta}_{5} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 4.0 I_{xx,5}
4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2
0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_2)} - 0.5 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{yy},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{yy},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\text{yy},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(
0.25 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_2) +
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.00 \, \sin(\theta_4) +
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + I_{\text{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + I_{\text{xv},5} \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
I_{xy,5}\dot{\theta}_1\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)} + I_{xy,5}\dot{\theta}_1\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_3)}\cos{(\theta_2)} + 0.25\,a_3\,l_{x_2,2}\,m_4\dot{\theta}_1\cos{(\theta_2)} - 0.25\,a_3\,l_{x_2,2}\,m_4\dot{\theta}_1\cos{(\theta_2)}
0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, 
0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} + 0.25 \, a_5 \, a_4 \, \sin{(\theta_2)} + 0.25 \, a_5 \, a_4 \, \sin{(\theta_2)} + 0.25 \, a_5 \, a_5 \, a_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} 
0.5 I_{xx.5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) +
0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(
2.0 \, a_4 \, \text{lc}_{42} \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 2.0 \, a_5 \, \text{lc}_{52} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 2.0 \, a_5 \, \text{lc}_{52} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 +
2.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.25 a_3 \log_{10} m_4 \dot{\theta}_1 \sin(\theta_4) \sin(\theta_2) - 0.5 a_3 \log_{10} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(\theta_4) - 0.5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(\theta_4) - 0.5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 0.25 a_3 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) + 0.25 a_5 \cos(\theta_5) + 
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} \, \sin{(\theta_2)} + 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,3} \, \mathrm{l
4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{xy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - I_{xy,5} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5)^2 + I_{xy,5} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5)^2 + I_{xy,5} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5)^2 + I_{xy,5} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5)^2 + I_{xy,5} \sin(2.0 \theta_5) 
I_{xz,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)+4.0I_{xy,4}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+4I_{xy,5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+2I_{xy,5}\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)
4I_{xy,5}\dot{\theta}_2\cos\left(\theta_3\right)\cos\left(\theta_5\right)\sin\left(\theta_3\right)\sin\left(\theta_5\right) + 4I_{xy,5}\dot{\theta}_2\cos\left(\theta_4\right)\cos\left(\theta_5\right)\sin\left(\theta_4\right)\sin\left(\theta_5\right) + I_{yz,5}\dot{\theta}_1\cos\left(\theta_3\right)\sin\left(\theta_5\right) + I_{yz,5}\dot{\theta}_2\cos\left(\theta_4\right)\sin\left(\theta_5\right) + I_{yz,5}\dot{\theta}_2\cos\left(\theta_5\right)\sin\left(\theta_5\right) + I_{yz,5}\dot{\theta}_3\cos\left(\theta_5\right)\sin\left(\theta_5\right) + I_{yz,5}\dot{\theta}_3\cos\left(\theta_5\right)\sin\left(\theta_5\right)
I_{\text{vz},5} \dot{\theta}_1 \cos (\theta_3) \cos (\theta_5) \sin (\theta_2) \sin (\theta_4) + I_{\text{yz},5} \dot{\theta}_1 \cos (\theta_4) \cos (\theta_5) \sin (\theta_2) \sin (\theta_3) + I_{\text{xz},5} \dot{\theta}_1 \cos (\theta_3) \sin (\theta_2) \sin (\theta_4) \sin (\theta_5) + I_{\text{yz},5} \dot{\theta}_1 \cos (\theta_5) \sin 
I_{xz,5}\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{xz,5}\dot{\theta}_1\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)\sin(\theta_4)+0.125\,a_3\,a_4\,m_4\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)+0.125\,a_3\,a_4\,m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_3)\sin(\theta_5)
0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) + a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \cos(\theta_5) - a_4 \, a_4 \, a_5 
I_{\text{vz},5} \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \ln_{4.1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) + a_2 \ln_{4.1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) - a_3 \ln_{4.1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) - a_4 \ln_{4.1} m_4 \dot{\theta}_3 \cos(\theta_4) \cos(
0.5 a_4 \log_{10} a_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.125 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - \log_{4.2} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) - \log_{4.3} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) - \log_{4.3} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) - \log_{4.3} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_4) - \log_{4.3} m_4 \dot{\theta}_4 \cos
lc_{4,2}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)-0.25a_3lc_{4,2}m_4\dot{\theta}_1\cos(\theta_2)\sin(\theta_4)-0.25a_3lc_{4,2}m_4\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)-a_2lc_{4,2}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,3}m_4\dot{\theta}_3\cos(\theta_4)-a_2lc_{4,
a_2 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_3) - a_4 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - a_4 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4 \log_{11} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.5 \log_{11} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 \log_{11} m_4 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_
0.5 a_4 \log_4 a_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_4 \log_4 a_4 \cos(\theta_3) \sin(\theta_4) - 0.5 a_4 \log_4 a_4 \cos(\theta_4) \sin(\theta_3) - 0.5 a_4 \log_4 a_5 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4 \log_4 a_5 \cos(\theta_4) \sin(\theta_3) - 0.5 a_4 \log_4 a_5 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4 \log_4 a_5 \cos(\theta_4) \cos(\theta_5) \cos(\theta_4) \cos(\theta_5) \cos(\theta
0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{
a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - a_4 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - a_4 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) - a_4 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) - a_4 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - a_4 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - a_4 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
a_4 \log_{10} a_4 \log_{10} a_5 \log_{10
0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{4,1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{4,1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{4,1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{4,1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2
0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - \log_{4.1} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - \log_{4.1} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) - \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - \log_{4.1} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) - \log_{4.1} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) - \log_{4.3} \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - \log_{4.3} m_4 \dot{\theta}_4 \cos(\theta_4) \cos(
lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)-lc_{4,1}lc_{4,3}m_4\dot{\theta}_4\cos(\theta_4)\sin(\theta_3)-0.25a_3lc_{4,1}m_4\dot{\theta}_1\sin(\theta_2)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)-a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\sin(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_3)+a_2lc_{4,1}m_4\dot{\theta}_3\cos(\theta_3)+a_2lc_{4
0.5 a_4 \log_2 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_5) + 0.5 a_3 \log_1 m_5 \dot{\theta}_2 \sin(\theta_4) \sin(\theta_5) + 0.125 a_4^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 \log_2 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) \sin(\theta_5)
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0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + lc_{4.2} lc_{4.3} m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + lc_{4.2} lc_{4.3} m_4 \dot{\theta}_4 \sin(\theta_4) + lc_{4.2} lc_{4.3}
0.5 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 \log_{4.2}^2 m_4 \dot{\theta}_3 \sin(2.0 \theta_4) \cos(\theta_4) \cos(
0.5 \, a_4^2 \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_4)
0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_
0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(
a_4 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 2.0 a_4 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 a_4 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 2.0 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_5) + 2.0 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) + 2.0 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_5) \cos
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) + 2.0 a_5 lc_{5,1} m_5 
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \cos(\theta_5) - 0.00 \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_5) \, \cos(\theta_4) \, \cos(\theta_5) \, \cos(\theta
a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) - a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2
0.5 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 4.0 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}
4.0 \log_{5,1}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 4.0 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} - 4.0 \log_{5,1}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5
4.0 \log_{5.2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 4.0 \log_{5.2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 a_5{^2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_3)} \cos{(2.0 \theta_4)} \cos{(2.0 \theta_5)} \cos{(\theta_2)} + 0.00 \log_{10}{(1.0 + 1.0)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.00 \log_{10}{(1.0 + 1.0)} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.00 \log_{10}{(1.0 + 1.0)} \cos{(\theta_5)^2} \cos{(\theta_5)
0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.00 \, \sin{(\theta
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,2}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{5,2}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, m_5 \, d_5 \, d_
0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, 
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} +
0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + a_2 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) - 0.5 a_3 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_5) 
a_2 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) - 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_5 \ln_{5
0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) + 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) + 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_5) \cos(\theta_
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, \dot{\theta}_3 \, \dot{
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos \left(\theta_4\right) \, \cos \left(\theta_5\right) \, \sin \left(\theta_3\right) - \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos \left(\theta_3\right) \, \cos \left(\theta_4\right) \, \cos \left(\theta_5\right) - \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos \left(\theta_3\right) \, \cos \left(\theta_4\right) \, \cos \left(\theta_5\right) - \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \cos \left(\theta_5\right) \, \cos \left(\theta_5\right) \, \cos \left(\theta_5\right) \, \cos \left(\theta_5\right) \, \sin \left(\theta_5\right) \, \cos \left(\theta_5\right) \, \sin \left(\theta_5\right) 
lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5) + a_2lc_{4,1}m_4\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_4) + a_2lc_{4,1}m_4\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_3) - a_2lc_{4,1}m_4\dot{\theta}_1\cos(\theta_2)\cos(\theta_3)\sin(\theta_4)
0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{11} m_5 \dot{\theta}_5 \cos(\theta_5) \cos
a_2 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + \log_{12} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + \log_{12} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + \log_{12} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + \log_{12} \log_{12} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + \log_{12} \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + \log_{12} \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + \log_{12} \log_{12} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) + lc_{5,2} lc_
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) + lc_{5
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) + lc_{5,2} lc_{5,3} m
4.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - a_2 \log_4 m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \log_4 m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 \log_4 m_4 \dot{\theta}_1 \cos(\theta_4) + 0.5 a_4 \log_4 m_4 \dot{
0.5 a_4 lc_{4,3} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_4 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
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a_4 \ln 3 = a_5 
a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{10} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(
0.5 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 6.0 \log_{11} \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)+lc_{4,1}lc_{4,3}m_4\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)+lc_{5,1}lc_{5,2}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_5)
lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_3\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_5)\sin(\theta_5)
lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)+
lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+a_2lc_{5,1}m_5\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)+a_3lc_{5,3}m_5\dot{\theta}_5\cos(\theta_5)\sin(\theta_5)
0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - \ln \ln \theta_2 \sin(\theta_3) \sin(\theta_4) - \ln \ln \theta_3 \sin(\theta_4) - \ln \ln \theta_3 \sin(\theta_4) \sin(\theta_5) - \ln \ln \theta_4 \sin(\theta_5) - \ln \ln \theta_5 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(\theta_5) - \ln \ln \theta_5 \sin(\theta_5) \sin(\theta_5)
lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{4}\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5})-8I_{xy,5}\dot{\theta}_{2}\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})^{2}\sin(\theta_{3})\sin(\theta_{4})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5})-8I_{xy,5}\dot{\theta}_{2}\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})^{2}\sin(\theta_{3})\sin(\theta_{4})-lc_{5,2}lc_{5,3}m_{5}\dot{\theta}_{5}\sin(\theta_{3})\sin(\theta_{4})\sin(\theta_{5})-8I_{xy,5}\dot{\theta}_{2}\cos(\theta_{3})\cos(\theta_{4})\cos(\theta_{5})^{2}\sin(\theta_{3})\sin(\theta_{4})
8I_{xy.5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)^2\cos(\theta_5)\sin(\theta_3)\sin(\theta_5) - 8I_{xy.5}\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5) - 0.5a_4lc_{4.1}m_4\dot{\theta}_1\cos(2.0\theta_3)\cos(2.0\theta_4)\cos(\theta_2) + 0.5a_4lc_{4.1}m_4\dot{\theta}_1\cos(2.0\theta_3)\cos(2.0\theta_4)\cos(\theta_2)
a_4 \ln a_5 
a_4 \ln a_5 = a_5 \ln a_5 \ln a_5 \cos (2.0 \, \theta_4) \sin (\theta_5) - a_4 \ln a_5 \cos (2.0 \, \theta_4) \sin (2.0 \, \theta_4) \cos (2.0 \, \theta_4) \cos (2.0 \, \theta_4) \sin (2.0 \, \theta_3) \cos (2.0 \, \theta_4) \sin (2.0 \, \theta_4) \cos (2.0 \,
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, 
lc_{4,1}lc_{4,2}m_4\dot{\theta}_1\cos(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + lc_{4,1}lc_{4,2}m_4\dot{\theta}_1\cos(2.0\,\theta_4)\sin(2.0\,\theta_3)\cos(\theta_2) + 0.5\,a_4lc_{4,1}m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) - 0.5\,a_4lc_{4,1}m_4\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\cos(\theta_2) + 0.5\,a_4lc_{4,1}m_4\dot{\theta}_1\sin(2.0\,\theta_4)\cos(\theta_2) + 0.5\,a_4lc_{4,1}m_4\dot{\theta}_1\cos(2.0\,\theta_4)\cos(\theta_2) + 0.5\,a_4lc_
a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(\theta_5) - a_4 \log_{11} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) + a_5 \log_{11
0.5 a_3 \log_{10} a_5 = 0.5 a_5 \log_{10} a_5 \log_
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5
0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5
0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} \, - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} \, - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} \, - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} \, - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos
0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(
4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_4\right) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right) \sin \left(\theta_5\right) - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \sin \left(2.0 \, \theta_3\right) \cos \left(\theta_4\right) \sin \left(\theta_5\right) + 1.0 \, \mathrm{lc}_{5,1} \,
0.5 a_5 \log_{10} a_5 \log
0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \cos{(\theta_2)} - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \cos{(\theta_2)} - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \cos{(\theta_2)} - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \cos{(\theta_2)} - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos
4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2) + a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_5) + a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_5) + a_4 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_3 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_4 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_5 \ln_{5,3} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta
0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\sin(2.0\,\theta_3)\sin(2.0\,\theta_4)\sin(2.0\,\theta_5)\cos(\theta_2) + lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)\sin(\theta_2) - lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_3)\sin(2.0\,\theta_5)\sin(\theta_2)
2.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} - a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \,
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a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 4 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4
lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5) - lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4) - lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3) - lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_4) - lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_4)\sin(\theta_4) - lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_4)\sin(\theta_4) - lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_4)\cos(\theta_5)\sin(\theta_4) - lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\cos(\theta_5)\sin(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5)\cos(\theta_5
4.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 4.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(
lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta_5)-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos(\theta
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) + 0.5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, d_5 \, \dot{\theta}_3 \, d_5 
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_1 \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} + a_4 lc_{5,1} m_5 \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_
a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) - a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_5) - a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_5) - a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
a_4 \ln a_5 = a_5 + a_5 
0.5 a_4 a_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_4 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + a_5 \log_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_5) + a_5 \log_{5,1} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{10} 2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 a_5 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
4.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
8.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 8.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 8.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 8.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 8.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 8.0 \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 8.0 \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
8.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 a_5 \log_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (A36)
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C_{25} = 2 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 - I_{xy,5} \dot{\theta}_2 + 2 I_{xy,5} \dot{\theta}_2 \cos(\theta_4)^2 + 2 I_{xy,5} \dot{\theta}_2 \cos(\theta_5)^2 + 0.5 I_{zz,5} \dot{\theta}_1 \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_2 + 0.5 \log_2
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 - 4 I_{xv,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4 I_{xv,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 4 I_{xv,5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2
   I_{\text{xx},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) + I_{\text{xx},5}\,\dot{\theta}_2\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + I_{\text{xx},5}\,\dot{\theta}_2\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) - I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) - I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + I_{\text{xx},5}\,\dot{\theta}_2\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + I_{\text{xx},5}\,\dot{\theta}_3\,\cos\left(\theta_4\right) + I_{\text{xx},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right) + I_{\text{xx
   I_{\text{vv},5}\dot{\theta}_2\cos(\theta_5)\sin(\theta_5) + 0.5 \log_{10}^2 m_5 \dot{\theta}_1\cos(\theta_2) + 0.5 \log_{10}^2 m_5 \dot{\theta}_1\cos(\theta_2) - 2.0 I_{\text{xx},5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)^2\sin(\theta_3) - 2.0 \log_{10}^2 \sin(\theta_3) + 0.0 \log_{10}^2 \cos(\theta_3) + 0.0 \log_{10}^2
2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)
2.0 I_{xx} = 5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx} = 5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{yy} = 5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{yy} = 6 \dot{\theta}_3 \cos(\theta_4)^2 \sin(\theta_5) + 2.0 I_{yy} = 6 \dot{\theta}_4 \cos(\theta_4)^2 
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_3)^2} - a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_4)^2} - a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_4)^2} + a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_5)^2} + a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_
a_5 \log_{12} m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 - 2.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 - 2.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos{(\theta_4)}^2 - 2.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 +
I_{xz,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)+I_{xz,5}\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)+I_{xz,5}\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)-I_{yz,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)-I_{yz,5}\dot{\theta}_3\cos(\theta_3)\cos(\theta_4)\sin(\theta_5)
I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - I_{\text{vz},5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - I_{\text{vz},5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - I_{\text{vz},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - I_{\text{vz},5} \dot{\theta}_5 \cos(\theta_5) \cos(
I_{vz,5} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - I_{vz,5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - I_{vz,5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - I_{vz,5} \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - I_{vz,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - I_{vz,5} \dot{\theta}_5 \cos(\theta_5) - I_{vz,5} \dot{\theta}_5 \cos(\theta_5) - I_{vz,5} \dot{\theta}_
0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 8 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 8 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 0
I_{xz,5}\dot{\theta}_3\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_3\cos(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_3\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{xz,5}\dot{\theta}_4\cos(\theta_3)\sin(\theta_4)-I_{xz,5}\dot{\theta}_4\cos(\theta_5)
I_{xz,5}\dot{\theta}_4\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)-I_{xz,5}\dot{\theta}_4\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-I_{xz,5}\dot{\theta}_5\cos(\theta_3)\sin(\theta_4)\sin(\theta_5)-I_{xz,5}\dot{\theta}_5\cos(\theta_4)\sin(\theta_5)
I_{xz,5}\dot{\theta}_5\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)-lc_{5,1}{}^2m_5\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{5,1}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{5,1}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{5,1}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_3)\sin(\theta_3)-lc_{5,1}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-lc_{5,1}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_3)\sin(\theta_4)-lc_{5,1}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_4)\sin(\theta_4)+lc_{5,2}{}^2m_5\dot{\theta}_2\cos(\theta_5)\sin(\theta_5)
lc_{5,2}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - lc_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + lc_{5,2}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + I_{vz,5} \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + I_{vz,5} \dot{\theta}_3 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + I_{vz,5} \dot{\theta}_3 \sin(\theta_5) 
I_{vz,5} \dot{\theta}_4 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + I_{vz,5} \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.25 a
0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 2.0 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 2.0 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 2.0 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 2.0 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 2.0 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{4}) \sin(\theta_{4}) - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{5}) - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{5})^{2} \sin(\theta_{5}) - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5})^{2} \sin(\theta_{5}) - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{5} \sin(\theta_{5}) 
2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,1}{}^2 \sin{(\theta_5)} + 2.0 \log_{5,1}{}^2 \sin{(\theta_5)} + 2.0 \log_{5,1}{}^2 \sin{(\theta_5)} + 2.0 \log_{5,1}{}^2 \cos{(\theta_5)} 
2.0 \log_{5.1}^{2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2}^{2} \cos(\theta_5) \cos(\theta_
2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{5}) + 4.0 I_{xx,5} \dot{\theta}_{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 4.0 I_{xx,5} \dot{\theta}_{2} \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{4}) + 4.0 I_{xx,5} \dot{\theta}_{3} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 4.0 I_{xx,5} \dot{\theta}_{5} \cos
   4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) - 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2
4.0 I_{\text{VV}} = 5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{XX}} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{XX}} = 0.5 i_{\text{XX}} =
0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + I_{xx,5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + I_{xx,5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} + 0.25\,a_4\,lc_{5,1}\,m_5\,\dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_2)} - 0.25\,a_4\,lc_{5,1}\,m_5\,\dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)
0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \,
0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(
2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,2} m_5 \dot
0.25 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} \, \sin{(\theta_2)} + 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 +
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 - I_{xv.5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - I_{xz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + I_{xx,5} \sin(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + I_{xx,5} \sin(\theta_3) \cos(\theta_4) \cos(\theta_5) 
4I_{xy.5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_4)\sin(\theta_3)\sin(\theta_4)+4I_{xy.5}\dot{\theta}_2\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)+4I_{xy.5}\dot{\theta}_2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5)+
I_{vz,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_4)\sin(\theta_2)\sin(\theta_5)+I_{vz,5}\dot{\theta}_1\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)+I_{vz,5}\dot{\theta}_1\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)+I_{vz,5}\dot{\theta}_1\cos(\theta_4)\sin(\theta_5)
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I_{xz,5}\dot{\theta}_1\cos(\theta_3)\sin(\theta_2)\sin(\theta_4)\sin(\theta_5)+I_{xz,5}\dot{\theta}_1\cos(\theta_4)\sin(\theta_2)\sin(\theta_3)\sin(\theta_5)+I_{xz,5}\dot{\theta}_1\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)-I_{xz,5}\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - I_{\text{vz},5} \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.25 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.25 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.25 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.25 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.25 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.25 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.25 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.25 \, a_5 \, \dot{\theta}_3 \, \cos
0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.125 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.125 \, a_5 \, a_
0.25 \, a_4 \, \ln 3 \, d_1 \cos (\theta_5) \sin (\theta_2) - a_5 \, \ln 3 \, d_2 \cos (\theta_3) \sin (\theta_3) + 0.5 \, a_3 \, \ln 3 \, d_2 \cos (\theta_4) \sin (\theta_5) + 0.5 \, a_3 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_4) - 0.5 \, a_4 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_3 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, \ln 3 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \sin (\theta_5) + 0.5 \, a_5 \, d_5 \cos (\theta_5) \cos (\theta_
a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - a_5 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 a_5 m_5 \dot{\theta}_2 \sin(\theta_4) \sin(\theta_5) + 0.25 a_4 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_5) + 0.25 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_4 \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) + 0.25 \alpha_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.25 \alpha_5 \cos(\theta_5) \sin(\theta_5) + 0.25 \alpha_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.25 \alpha_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.25 \alpha_5 \cos(\theta_5) \cos(\theta_5)
0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_
0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) +
0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_4 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) + 2.0 a_5 \ln_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 0.5 a_4 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_4) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 a_5 \ln_{5,2} 
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta
2.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_3 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.00 \cos(\theta_5) \sin(\theta_5) + 0.00 \cos(\theta_5) \cos(\theta
a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)
0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 4.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 4.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, 
4.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 \log_{5,2}{}^2 \sin(\theta_5) + 4.0 \log_{5,2}{}^2 \cos(\theta_5) \cos(
4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.00 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.00 \, \sin(\theta_5) + 0.00 \, \sin(\theta_5
0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta
0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \,
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta
0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} - 0.5 \, a_3 \log_{5,2}{m_5} \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)} \cos{(\theta_5)} - a_2 \log_{5,2}{m_5} \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} - a_2 \log_{5,2}{m_5} \dot{\theta}_2 \cos{(\theta_5)} - a_2 \log_{5,2}{m_5} \dot{\theta}_3 \cos{(\theta_5)} - a_2 \log_{5,2}{m_5} \dot{\theta}_3 \cos{(\theta_5)} - a_3 \log_{5,2}{m_5} \dot{\theta}_3 \cos{(\theta_5)}
0.5 a_5 \log_{3} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{3} m_5 \dot{\theta}_5 \cos(\theta
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 \, 
0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - \log_{10} \log_{10} \cos(\theta_5) \cos(\theta_5)
lc_{5,1}lc_{5,3}m_5\dot{\theta}_4\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)-lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_3)\cos(\theta_4)\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_2)\cos(\theta_4)\sin(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,1}m_5\dot{\theta}_1\cos(\theta_5)-0.5a_3lc_{5,
0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_4) - a_2 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_4) - a_3 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) - a_3 \log_{10} m_5 \dot{\theta}
a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + \log_{10} \log_{10} \theta_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + \log_{10} \log_{10} \theta_3 \cos(\theta_5) \sin(\theta_4) + \log_{10} \log_{10} \theta_3 \cos(\theta_5) \sin(\theta_5) + \log_{10} \log_{10} \theta_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) + \log_{10} \log_{10} \theta_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) 
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) 
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.5 a_3 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.0 a_5 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.0 a_5 lc_{5,2} lc_{5,3} lc_{5,2} lc_{5,2} lc_{5,3} lc_{5,2} lc_{5,2} lc_{5,3} lc_{5,2} lc_{5,2} lc_{5,3} lc_{5,2} lc_{5,2
a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_2 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_3 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_4 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + a_5 \log_{12} m_5 \dot{\theta}_5 \cos(\theta_5) + a_5 \log_{12
0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_{13} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{13} m_5 \cos(\theta_5) + 0.5 \log_{13} m_
0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \log_3 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \cos(\theta_5) \cos(
0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5 \ln 3 m_5 \dot{\theta}_5 \cos(\theta_5)
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0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{10} \log_{10} \cos(\theta_5) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + lc_{5,1} lc_{5,3} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + lc_{5,1} lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) + lc_{5,2} lc_
lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_4)\sin(\theta_3)\sin(\theta_5)+lc_{5,1}lc_{5,3}m_5\dot{\theta}_5\cos(\theta_5)\sin(\theta_3)\sin(\theta_4)+a_2lc_{5,1}m_5\dot{\theta}_2\sin(\theta_3)\sin(\theta_4)\sin(\theta_5)+a_3lc_{5,3}m_5\dot{\theta}_5\cos(\theta_5)\sin(\theta_5)
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_
lc_{5,2} lc_{5,3} m_5 \dot{\theta}_5 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 8 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 8 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 8 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 8 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 8 I_{xy,5} \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 8 I_{xy,5} \dot{\theta}_3 \cos(\theta_5) \cos(\theta
8I_{xy} = 5\dot{\theta}_2\cos(\theta_3)^2\cos(\theta_4)\cos(\theta_5)\sin(\theta_4)\sin(\theta_5) + 0.5a_4lc_{5,1}m_5\dot{\theta}_2\cos(2.0\theta_3)\cos(2.0\theta_4)\cos(\theta_5) - 0.5a_4lc_{5,2}m_5\dot{\theta}_2\cos(2.0\theta_3)\cos(2.0\theta_4)\sin(\theta_5) - 0.5a_4lc_{5,2}m_5\dot{\theta}_2\cos(2.0\theta_3)\cos(2.0\theta_4)\sin(\theta_5)
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \log_{10} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, d_5 \, d_
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) \, d_5 \, d_
0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_3) \sin(\theta_4) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \phi_5) \cos(2.
   0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5)
0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5)^2 \, \sin(\theta_3) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5)^2 \, \sin(\theta_4) \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) - 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5)^2 \, \sin(\theta_5) \, d\phi_5 \, d\phi_
4.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(
4.0 I_{\text{VV}} = 5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_3)}\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)}-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_4)}\cos{(\theta_2)}-lc_{5,1}lc_{5,2}m_5\dot{\theta}_1\cos{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}
lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta
a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) 
a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + a_3 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_
0.5 \, a_5 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, a_
0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + \log_{11} \log_{12} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + \log_{11} \log_{11} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + \log_{11} \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_4) + \log_{11} \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_4) + \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) 
\log_{10} 
a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_5) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
2.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 1} \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, - 4.0 \,
lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_3)\cos(\theta_5)\sin(\theta_2)\sin(\theta_4)-lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_4)\cos(\theta_5)\sin(\theta_2)\sin(\theta_3)-4.0lc_{5,1}lc_{5,2}m_5\dot{\theta}_2\cos(\theta_3)\cos(\theta_5)\sin(\theta_3)\sin(\theta_5)-1.0lc_{5,2}lc_{5,3}m_5\dot{\theta}_1\cos(\theta_5)\sin(\theta_5)
4.0 \log_{11} \log_{12} \log_{
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
lc_{5,1} lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - lc_{5,1} lc_{5,3} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(\theta_3) \sin(\theta_5) - 0.5 a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_4 lc_{5,3} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(\theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_5) \, d_5 \, d_5
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + l_{5.2} \, l_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, l_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, l_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, l_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, l_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos
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0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos (2.0 \, \theta_3) \, \sin (2.0 \, \theta_4) \, \cos (\theta_2) \, \cos (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos (2.0 \, \theta_4) \, \sin (2.0 \, \theta_3) \, \cos (\theta_2) \, \cos (\theta_5) - 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos (2.0 \, \theta_4) \, \sin (2.0 \, \theta_3) \, \cos (\theta_2) \, \sin (\theta_5) - 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos (2.0 \, \theta_4) \, \sin (2.0 \, \theta_3) \, \cos (\theta_2) \, \sin (\theta_5) - 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin (2.0 \, \theta_3) \, \sin (2.0 \, \theta_4) \, \cos (\theta_2) \, \cos (\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin (2.0 \, \theta_3) \, \sin (2.0 \, \theta_4) \, \cos (\theta_2) \, \sin (\theta_5) - 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin (2.0 \, \theta_3) \, \sin (2.0 \, \theta_4) \, \cos (\theta_2) \, \sin (\theta_5) + a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin (2.0 \, \theta_3) \, \sin (2.0 \, \theta_4) \, \cos (\theta_2) \, \sin (\theta_5) + a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_3) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos (\theta_3) \, \cos (\theta_4) \, \cos (\theta_5) \, \sin (\theta_4) \, \sin (\theta_5) + 0.5 \, a_5
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C_{31} = -0.5 I_{xy,3} \dot{\theta}_1 \cos(2.0 \theta_3) - 0.25 I_{xx,3} \dot{\theta}_1 \sin(2.0 \theta_3) + 0.25 I_{yy,3} \dot{\theta}_1 \sin(2.0 \theta_3) - 0.5 I_{zz,3} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{zz,3} \dot{\theta}_3 \sin(2.0 \theta_3) + 0.25 I_{zz,3} \dot{\theta}_4 \sin(2.0 \theta_3) + 0.25 I_{zz,3} \dot{\theta}_5 \cos(\theta_2) - 0.25 I_{zz,3} \dot{\theta}_5 \cos(\theta_3) + 0.25 I_
0.5 I_{zz,4} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{zz,5} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{xv,3} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) - 0.5 I_{xv,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.5 I_{xv,5} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{xv,5} 
0.25 I_{xx,3} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta
0.25 I_{\text{vv},3} \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \sin{(2.0 \,\theta_3)} + 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} + 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} + 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_3)} + 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos{(2.0 \,\theta_3)} 
0.5 I_{xy,4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.5 I_{xx,3} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(\theta_2)} + 0.5 I_{yy,3} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(\theta_2)} + 1.0 I_{xy,3} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \cos{(\theta_2)} - 0.5 I_{xy,3} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \cos{(\theta_2)} + 0.5 I_{xy,3} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta
0.5 I_{xz,3} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_3)} + 0.0625 a_3^2 m_3 \dot{\theta}_1 \sin{(2.0\,\theta_3)} + 0.25 a_3^2 m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} + 0.25 a_3^2 m_5 \dot{\theta}_2 \sin{(2.0\,\theta_3)} + 0.25 a_3^2 m_5 \dot{\theta}_3 \sin{(2.0\,\theta_3)} + 
0.5 I_{vz.3} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} + 0.25 \log_{3.1}{^2} m_3 \dot{\theta}_1 \sin{(2.0\,\theta_3)} - 0.25 \log_{3.2}{^2} m_3 \dot{\theta}_1 \sin{(2.0\,\theta_3)} - 0.125 a_3{^2} m_3 \dot{\theta}_2 \cos{(\theta_2)} - 0.125 
0.5 a_3^2 m_4 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_3^2 m_5 \dot{\theta}_2 \cos(\theta_2) - 0.125 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) + 0.000 \cos(\theta_2) - 0.000 \cos(\theta_2) + 0.000 \cos(\theta_2) \cos(\theta_2) + 0.000 \cos(\theta_2) \cos(\theta_2
1.0 I_{vz,3} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) - 0.5 \log_{11}^2 m_3 \dot{\theta}_2 \cos(\theta_2) - 0.5 \log_{12}^2 m_3 \dot{\theta}_2 \cos(\theta_2) - 0.5 \log_{12}^2 m_4 \dot{\theta}_2 \cos(\theta_
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_2) + 1.0 I_{xz,3} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) + 0.5 I_{xx,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_2) + 1.0 I_{xz,3} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) + 0.5 I_{xx,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_2) + 1.0 I_{xz,3} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) + 0.5 I_{xx,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_2) + 1.0 I_{xz,3} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) + 0.5 I_{xx,4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_2) + 0.5 
0.5 I_{yy} + \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.25 \log_{10} \frac{1}{2} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) - 0.25 \log_{10} \frac{1}{2} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) + 0.25 \log_{10} \frac{1}{2} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.
0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \phi_1) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \phi_1) + 0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \phi_1) + 0
0.25 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 a_3^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_3^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) + 0.00 \cos
0.5 a_3^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xz,1}^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xz,2}^2 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xz,3}^2 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xz,4}^2 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xz,4}^2 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xz,4}^2 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xz,4}^2 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xz,4}^2 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xz,4}^2 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xz,4}^2 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) + 0.5 I_{xz,4}^2 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3
0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{2} \cos(2.0 \theta_{3}) \cos(\theta_{2}) + 0.5 I_{yz,4} \dot{\theta}_{1} \sin(2.0 \theta_{2}) \cos(\theta_{3}) \sin(\theta_{4}) + 0.5 I_{yz,4} \dot{\theta}_{1} \sin(2.0 \theta_{2}) \cos(\theta_{4}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{2} \cos(2.0 \theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{2} \cos(2.0 \theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{3} \sin(2.0 \theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{3} \sin(\theta_{3}) \cos(\theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{3} \sin(\theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} \dot{\theta}_{3} \sin(\theta_{3}) + 0.5 \log_{3} 2^{2} m_{3} 
0.5 I_{xz,4} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.5 I_{xy,4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} + 0.5 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} + 0.5 I_{xy,4} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(
0.25 a_3 lc_{3,2} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 lc_{3,1} lc_{3,2} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 I_{xx,4} \dot{\theta}_3 \cos(2.0 \theta_4) - 0.25 I_{xx,4} \dot{\theta}_4 \cos(2.0 \theta_4) - 0.25 I_{xx,4} \dot{
0.25 I_{xx,4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} + 0.25 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.25 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} + 0.25 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.25 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} + 0.25 I_{xx,5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} + 0.25 I_{xx,5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} + 0.25 I_{x
0.25 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.25 I_{yy,4} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.25 I_{yy,4} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} - 0.25 I_{yy,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} + 0.25 I_{yy,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,
0.25 I_{\text{VV},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.25 I_{\text{VV},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.25 I_{\text{VV},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
0.25 a_3 lc_{3.1} m_3 \dot{\theta}_1 \sin(2.0 \theta_3) + 0.5 I_{xv,4} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{xv,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 I_{xv,6} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 I_{xv,6} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(
0.5 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.5 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.25 I_{xx,5} \dot{\theta}_1 \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.5 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,
0.25\,I_{\text{vv}.5}\,\dot{\theta}_{1}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})} + 1.0\,I_{\text{vz}.4}\,\dot{\theta}_{2}\,\cos{(\theta_{3})}\,\cos{(\theta_{4})}\,\sin{(\theta_{2})} + 1.0\,I_{\text{xz},4}\,\dot{\theta}_{2}\,\cos{(\theta_{3})}\,\sin{(\theta_{2})} + 1.0\,I_{\text{xz}}\,\dot{\theta}_{2}\,\cos{(\theta_{3})}\,\sin{(\theta_{2})} + 1.0\,I_{\text{xz}}\,\dot{\theta}_{2}\,\cos{(\theta_{3})}\,\sin{(\theta_{3})} + 1.0\,I_{\text{xz}}\,\dot{\theta}_{2}\,\cos{(\theta_{3})}\,\sin{(\theta_{3})} + 1.0\,I_{\text{xz}}\,\dot{\theta}_{3}\,\sin{(\theta_{3})}\,\dot{\theta}_{3}\,\sin{(\theta_{3})} + 1.0\,I_{\text{xz}}\,\dot{\theta}_{3}\,\sin{(\theta_{3})}\,\dot{\theta}_{3}\,\sin{(\theta_{3})}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_{3}\,\dot{\theta}_
0.5 a_2 a_3 m_5 \dot{\theta}_1 \cos(\theta_3) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_4
0.5 a_2 \log_{11} m_3 \dot{\theta}_1 \cos(\theta_3) - 0.5 a_3 \log_{11} m_3 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_4 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_2) + 0.5 a_5 \log_{11}
1.0 I_{xy,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 1.0 I_{xy,4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) + 0.5 a_2 lc_{3,2} m_3 \dot{\theta}_1 \sin(\theta_3) + 0.0 cos(\theta_2) + 0.0 cos(\theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 cos(\theta_3) \sin(2.0 \theta_4) \cos(\theta_3) \cos(\theta_3) + 0.0 cos(\theta_3) \cos(\theta_3) \cos(\theta_3
0.0625 \, a_3^2 \, m_3 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.25 \, a_3^2 
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.025 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{
0.25 a_4^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{12} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{12} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{11} \log_{11} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{11} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 \log_{11} \log_{11} m_3 \dot{\theta}_1 \cos(2.0 \theta_3) + 0.5 \log_{11} m_3 \dot{\theta}_1 \cos(2.0 \phi_3) + 0.5 \log_{11} m_3 \dot{\theta}_1 \cos(2.0 \phi_3) + 0.5 \log_{11} m_3 \dot{\theta}_1 \cos(2.0 \phi_3) + 0.5 \log_{11} m_3 \dot{\theta}_1 
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.25\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_3)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} - 0.25\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
0.25 \, a_3 \, \log_{3.1} \, m_3 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) + 0.25 \, a_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.25 \, a_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) - 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) + 0.25 \, \alpha_4 \, \log_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(
0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.5 I_{xy.5} \dot{\theta}_4 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.25 a_4 lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_2 \sin(2.0 \theta_4) - 0.5 lc_{4,1} lc_{4,2} lc_
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0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_2 \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_3 \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_4 \sin(\theta_5) + 0.5 I_{\text{xz},5} \dot{\theta}_5 \sin(\theta_5) + 0.5 I_{\text{xz}
0.5 I_{xz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 I_{yz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{yz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 I_{yz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) - 0.5 I_{yz.5} \dot{\theta}_2 \sin(\theta_5) - 0.5 I_{yz.5} \dot{\theta}_3 \sin(\theta_5) - 0.5 I_{yz.5} \dot{\theta}_4 \sin(\theta_5) - 0.5 I_{yz.5} \dot{\theta}_5 \sin(\theta_5) - 0.5 I_{yz.5} \dot{\theta}_5
0.5 I_{yz,5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} + 0.25 a_2 a_3 m_3 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(\theta_3)} + 0.5 a_2 a_3 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{
0.5 a_2 a_3 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5
0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \log_{11} m_3 \dot{\theta}_1 \cos(2.0\theta_2) \cos(\theta_3) + 0.5 a_3 \log_{11} m_3 \dot{\theta}_2 \cos(2.0\theta_3) \cos(\theta_2) + 0.5 \log_{11} m_3 \dot{\theta}_3 \cos(2.0\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \log_{11} m_3 \dot{\theta}_4 \cos(2.0\theta_2) \cos(\theta_3) + 0.5 \log_{11} m_3 \dot{\theta}_2 \cos(2.0\theta_3) \cos(\theta_3) + 0.5 \log_{11} m_3 \dot{\theta}_3 \cos(2.0\theta_3) \cos(\theta_3) + 0.5 \log_{11} m_3 \dot{\theta}_4 \cos(2.0\theta_3) \cos(\theta_3) + 0.5 \log_{11} m_3 \dot{\theta}_5 \cos(2.0\theta_3) \cos(2.0\theta_
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta
1.0 I_{\text{xv},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 1.0 I_{\text{xv},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} - 1.0 I_{\text{xv},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} - 1.0 I_{\text{xv},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} - 1.0 I_{\text{xv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(
0.5 a_2 \log_3 2 m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) - 0.5 a_3 \log_3 2 m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) + 0.25 a_3 \log_3 3 m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) + 0.5 a_2 \log_3 2 m_3 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) + 0.5 a_2 \log_3 2 m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) + 0.25 a_3 \log_3 2 m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_3) + 0.5 a_3 \log_3 2 m_3 \dot{\theta}_3 \cos(\theta_3) + 0.5 \log_3 2 m_3 \cos(\theta
0.5 a_3 \ln \ln m_4 \dot{\theta}_1 \cos (2.0 \theta_3) \sin (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_2) \sin (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_2) \cos (\theta_3) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (\theta_4) + 0.5 a_3 \ln m_4 \dot{\theta}_1 \sin (2.0 \theta_3) \cos (
0.5 a_3 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) + 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) + 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2
0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_5) \, \cos(2.0 \, \theta
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 1.0 lc_{3.1} lc_{3.2} m_3 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.5 \log_{3.1} \log_{3.3} m_3 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 I_{xx.5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy.5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) +
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
0.5 a_3 lc_{4,2} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_3)} \sin{(\theta_4)} + 0.25 lc_{4,1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \,\theta_2)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} + 0.25 lc_{4,1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} - 0.5 lc_{4,1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_3
0.25 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, \text{lc}_{4,2}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.25 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \text{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 
0.25 \log_{5.1}{}^2 m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} - 0.25 \log_{5.1}{}^2 m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta
0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.5 \log_{3,2}{\log_{3,3} m_3 \dot{\theta}_1} \sin{(2.0\,\theta_2)} \sin{(\theta_3)} + 0.25 \log_{3,2}{\log_{3,2} \log_{3,3} m_3 \dot{\theta}_1} \sin{(2.0\,\theta_2)} \sin{(\theta_3)} + 0.25 \log_{3,2}{\log_{3,2} \log_{3,3} m_3 \dot{\theta}_1} \sin{(2.0\,\theta_2)} \sin{(\theta_3)} + 0.25 \log_{3,2}{\log_{3,2} \log_{3,3} m_3 \dot{\theta}_1} \sin{(2.0\,\theta_2)} \sin{(\theta_3)} + 0.25 \log_{3,2}{\log_{3,2} \log_{3,2} \log_
1.0 I_{xx,5} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 1.0 I_{xz,5} \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_2)} + 0.0625 a_5^2 m_5 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 0.000 \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_5)} \sin{(2.0\,\theta_5)} \sin{(
1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5
0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_5) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0
0.5 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) - 0.5 a_3 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) - 1.0 a_3 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) + 1.0 I_{vz,5} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_3 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) + 1.0 I_{vz,5} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_3 a_4 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_4) + 1.0 I_{vz,5} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_3 a_4 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta
1.0 \, a_2 \, \mathrm{lc}_{3.2} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} - 0.5 \, a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, d_5 \, d
1.0 \, a_2 \, a_3 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} - 1.0 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 1.0 \, a_1 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_2 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_2)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_2)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_2)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3
1.0 a_2 \log_{11} m_3 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_3) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) + 1.0 a_3 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_4 \cos(\theta_4) + 0.5 a_2 \log_{12} m_4 \dot{\theta}_4 \cos(
1.0 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_4 \, a_4 \, d_4 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_5 \,
0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, \mathrm{lc}_{4.1}^2 \,
0.5 \log_{4.2}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 1.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) - 1.0 a_1 \log_{3.2} m_3 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) - 1.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) - 1.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 1.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 1.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_3 \cos(\theta_3) \cos(\theta
0.5 \, a_3 \, \mathrm{lc}_{3.3} \, m_3 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, d_4 \, d
1.0 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.125 \, a_4^{\, 2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.125 \, a_4^{\, 2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.125 \, a_4^{\, 2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.125 \, a_4^{\, 2} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \,
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0.5 a_4^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 \log_{1.1} \log_{1.3} m_3 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) - 0.5 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_2) + 0.0 \log_{1.1}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_4) \cos(\theta_2) \cos(\theta_2
0.5 \lg_{4.2}{2} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 \lg_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} + 0.25 \lg_{3.2}{2} m_3 \dot{\theta}_1 \cos{(2.0\,\theta_2)} \cos{(2.0\,\theta_3)} + 0.25 \lg_{3.2}{2} m_3 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.
0.25 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)
0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_3 \cos(2.0 \phi_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_3 \cos(2.0 \phi_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}_3 \cos(2.0 \phi_5) + 0.25 \log_{10} 2 m_5 \dot{\theta}
0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_4 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, d_4 \, d_5 \, 
1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_2 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \,
1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.00 \, \sin{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)}
0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 1.0 a_3 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \sin(\theta_4) - 0.5 a_2 lc_{4,2} m_4 \dot{\theta}_4 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_
1.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} - 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.00 \, \mathrm{lc}_{5\,3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, m_5 \, d_5 \, m_5 \, d_5 \, m_5 \, d_5 \, m_5 \, d_5 \, d_5 \, m_5 \, d_5 \, d_
0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_
0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, d_3 \, d_3 \, d_4 \, d_4 \, d_4 \, d_5 \, d_4 \, d_5 \, 
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, \text{lc}_{5,1}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{5,2}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{
0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, d_
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \lg_4 2 \lg_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 \lg_4 2 \lg_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 \lg_4 2 \lg_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 \lg_4 2 \lg_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 \lg_4 2 \lg_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 \lg_4 2 \lg_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 \lg_4 2 \lg_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) 
0.25 \, a_4 \, \mathrm{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{l
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_5) 
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 \log_{1.2}^{2} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 \log_{4.1} \log_{4.3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_4 \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.25 a_5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 \log_{10} m_4 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 \log_{10} m_4 \sin(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.0 \theta_
0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)}
0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.25 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} -
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 0.25 a_4 \log_{10} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) +
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 1.0 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.00 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 1.0 \, a_1 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 1.0 \, a_2 \, a_3 \, a_4 \, a_4 \, a_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 1.0 \, a_4 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 1.0 \, a_5 \, a_
0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 1.0 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 a_4 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) + 0.5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(
0.5 \log_{11} \log_{22} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.5 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) + 0.5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \phi_5) + 0.5 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \phi_5) + 0.5 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \phi_5) + 0.5 \log_{11} m_5 \dot{\theta}_2 \cos(2.0
0.5 \log_{11} \log_{22} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) +
1.0 a_1 \ln a_1 \ln a_2 \ln a_3 \ln a_4 \ln
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0.5 a_2 \ln a_1 \ln a_2 \ln a_3 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln a_1 \ln a_2 \ln a_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_2 \ln a_1 \ln a_2 \ln a_3 \cos(\theta_5) \sin(\theta_3) + 0.5 a_2 \ln a_1 \ln a_2 \ln a_2 \ln a_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln a_2 \ln a_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln a_3 \ln a_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln a_3 \ln a_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln a_3 \ln a_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln a_3 \ln a_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \ln a_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \ln a_3 \cos(\theta_5) \cos
1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, d\phi_5 \, d\phi_
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 1.0 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 1.0 \, a_1 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_2 \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} \, \sin{(\theta_2)} \, \sin{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} \, \sin{(\theta_2)} \, \cos{(\theta_2)} \, \cos
1.0 a_1 \ln a_2 \ln a_4 + \ln a_1 \ln a_2 \ln a_4 + \ln a_2 \ln a_4 + \ln a_4 
0.5 a_4 lc_{4,3} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 0.5 a_2 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) - 0.5 a_2 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) - 0.5 a_2 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) - 0.5 a_2 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) -
0.5 a_2 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 1.0 a_3 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 a_4 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) - 1.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
1.0 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{
1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_1 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.0 \, a_2 \, a_3 \, a_4 \, a_
1.0 \, a_1 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_2) \, \sin(\theta_4) \, \sin(\theta_5) - 0.5 \, a_5 \, a_5
0.5 a_3 a_5 m_5 \dot{\theta}_5 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 1.0 \lg_{4.1} \lg_{4.3} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 \lg_{4.1} \lg_{4.3} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.3} m_4 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.1} m_5 \dot{\theta}_3 \sin(\theta_5) \sin(\theta_5) - 1.0 \lg_{4.1} \lg_{4.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin
1.0 \, a_1 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 1.0 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \mathrm{lc}_{4.3} \, \mathrm{lc}_{4.3} \, m_4 \, \dot{\theta}_3 \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \mathrm{lc}_{4.3} \, \mathrm{lc
0.5 a_3 \ln a_4 2 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) + 0.5 a_4 \ln a_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 a_4 \ln a_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_5 \ln a_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_5 \ln a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.5 a_5 \ln a_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \,
0.5\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\sin{(\theta_4)} + 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} - 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.5\,a_3\,\mathrm{lc_{4.1}}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.
0.5 a_4 \ln_4 2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4 \ln_4 2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_4 \ln_5 2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_4 \ln_5 2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2
0.5 \, a_4 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.25 \, \dot{\theta}_3 \, \dot{
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.0000 \, \sin{(2.0 \, \theta_5)} + 0.0000 \, \cos{(2.0 \, \theta_5)} + 0.0000 \, \sin{(2.0 \, 
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3
1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_3 \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_4) - 0.5 \log_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(
0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta
0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} + 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} + 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, 
0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.25 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.25 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{3}) + 0.25 a_{5} \log_{5} 2 m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \cos(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \cos(2.0 \theta_{3}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{2}) \cos(2.0 \theta_{3}) \sin(2.0 \theta_{5}) + 0.25 a_{5} \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \cos(2.0 \theta_{5
0.25 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)}
0.5 a_2 \ln_5 a_2 \ln_5 \theta_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_3 \ln_5 a_2 m_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_5 \ln_5 a_2 \ln_5 \theta_2 \cos(2.0 \theta_5) \cos(\theta_5) - 1.0 a_5 \ln_5 
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.5 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.25 a_5 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
0.5 a_2 \ln_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 1.0 a_3 \ln_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 a_5 \ln_{10} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(
1.0 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - 1.0 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \cos(\theta_5) \sin(\theta_4) - 1.0 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \lg_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 \lg_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 \lg_{5.2}
0.5 a_2 \ln_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 \ln_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) +
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1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, d_5 \, d
1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d
0.25 a_5 \log_{3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_{3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) +
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, m_5
0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 \lg_{5.1} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) +
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) +
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos
0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_5) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_5) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_5) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_5) + 0.5 \log_2 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos
0.5 a_4 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5) + 0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(2.0 \theta_5
0.25 a_5 \ln 3 a_5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) - 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) - 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_2) \sin (\theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_3) \sin (\theta_4) \sin (\theta_5) + 0.5 \ln 3 \ln 5 \theta_1 \sin (2.0 \theta_3) \sin (\theta_4) \sin (2.0 \theta_3) \sin (2.0 \theta_3)
0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) - 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5
0.5 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.
0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.00 \, (0.00 \, m_5) \, d_1 \, \cos{(\theta_5)} + 0.00 \, (0.00 \, m_5) \, d_2 \, \cos{(\theta_5)} \, d_3 \, \cos{(\theta_5)} \, d_3 \, \cos{(\theta_5)} \, d_4 \, \cos{(\theta_5)} \, d_5 \, d_
1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_4) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) + 1.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_5) + 1.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_5) + 1.0 \log_{5,2} m_5 \dot{\theta}_3 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \cos
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{5.1} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5
0.5 a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_5) - 0.5 a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) +
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) +
0.5 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
1.0 \, a_1 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, d\phi_5 
1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_2) - 0.5 \, a_1 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_{5,2} \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_3) \, \cos(\theta_4) \, \cos(\theta_4) \, \sin(\theta_3) \, \cos(\theta_4) \, \cos(\theta_4)
0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) 
0.5\,a_2\,a_5\,m_5\,\dot{\theta}_2\,\cos{(\theta_2)}\,\cos{(\theta_2)}\,\sin{(\theta_3)}\sin{(\theta_3)}\sin{(\theta_5)} + 0.5\,a_2\,a_5\,m_5\,\dot{\theta}_2\,\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_3)}\sin{(\theta_4)} - 1.0\,\mathrm{lc}_{5,1}\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)} - 0.5\,a_2\,a_5\,m_5\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_3)}\sin{(\theta_3)}\sin{(\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_3)}\sin{(\theta_3)}\sin{(2.0\,\theta_4)}\sin{(2.0\,\theta_5)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_2)}\cos{(\theta_
1.0 \log_{5.1} \log_{5.1} \log_{5.0} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 a_1 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 a_1 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 \log_{5.1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
1.0 \, a_1 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{
1.0 \, a_2 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_5) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5)
1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 1.0 a_1 \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + 1.0 a_1 \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
1.0 \, a_1 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
0.5 a_5 \log_3 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.25 a_3 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
0.5 a_1 a_5 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 l_{5,1} l_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 l_{5,1} l_{5,3} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 1.0 l_{5,1} l_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 l_{5,1} l_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 l_{5,1} l_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 l_{5,1} l_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) 
1.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_3 \log_{11} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.0 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 1.0 \, a_1 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_1 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_{5,3} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) \, \cos(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) \, \cos(\theta_5) \, d_5 
0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \cos(\theta_3) \cos(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_2 \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,3} m_5 \dot{\theta}_3 \sin(\theta_5) - 1.0 lc_{5,2} lc_{5,2} lc_{5,2} m_5 \dot{\theta}_3 m_5
```

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0.5 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.5 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.25 \, a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} - 0.25 \, a_5 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, - 0.25 \, a_5
```

```
C_{32} = 1.0 I_{\text{xv},3} \dot{\theta}_2 \cos(2.0 \theta_3) + 0.5 I_{\text{xx},3} \dot{\theta}_2 \sin(2.0 \theta_3) - 0.5 I_{\text{yv},3} \dot{\theta}_2 \sin(2.0 \theta_3) - 0.5 I_{\text{zz},3} \dot{\theta}_1 \cos(\theta_2) - 0.5 I_{\text{zz},4} \dot{\theta}_1 \cos(\theta_2) - 0.5 I_{\text{zz},4} \dot{\theta}_2 \sin(2.0 \theta_3) + 0.5 I_{\text{zz},4} \dot{\theta}_2 \sin(2.0 \theta_3) - 0.5 I_{\text{zz},4} \dot{\theta}_2 \cos(\theta_2) -
0.5 I_{zz.5} \dot{\theta}_1 \cos(\theta_2) + 1.0 I_{xy.4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.5 I_{xx.4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx.4} \dot{\theta}_2 \cos(2.0 \theta_4) \theta_4) + 0.5 I_{xx.4} \dot{\theta}_2 \cos(2.
0.5 I_{\text{yv},4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{\text{yv},4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) - 1.0 I_{\text{xv},4} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{\text{yv},4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{\text{yv},4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{\text{yv},4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 I_{\text{yv},4} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \cos
0.5 I_{xx,3} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 I_{yy,3} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) + 1.0 I_{xy,3} \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_2) - 0.125 a_3^2 m_3 \dot{\theta}_2 \sin(2.0 \theta_3) - 0.125 a_3^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) - 0.125 a_3^2 m_3 \dot{\theta}_3 \sin(2.0 \theta_3) - 0.125 a_3^2 m_3 
0.5 a_3^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) - 0.5 a_3^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) - 0.5 \log_{10} 2 \sin(2.0 \theta_3) + 0.5 \log_{10} 2 \sin(2.0 \theta_3) + 0.5 \log_{10} 2 \sin(2.0 \theta_3) - 0.5 \log_{10} 2 \sin(2.0 \theta_3) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) + 
0.125 \, a_3^2 \, m_3 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_3^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_3^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} - 0.5 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} + 0.5 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} + 0.5 \, a_5^2 \, \dot{\theta}_3 \, \cos{(\theta_2)} 
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) + 1.0 I_{\text{vz},3} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) - 0.5 \log_{3,1}^2 m_3 \dot{\theta}_1 \cos(\theta_2) - 0.5 \log_{3,2}^2 m_3 \dot{\theta}_1 \cos(\theta_2) - 0.5 \log_{4,1}^2 m_4 \dot{\theta}_1 \cos(\theta_2) - 0
0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) - 0.5 \operatorname{lc}_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) - 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) + 1.0 I_{xz,3} \dot{\theta}_{1} \sin (\theta_{2}) \sin (\theta_{3}) + 0.5 I_{xx,4} \dot{\theta}_{1} \sin (2.0 \theta_{3}) \sin (2.0 \theta_{4}) \cos (\theta_{2}) - 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) + 1.0 I_{xz,3} \dot{\theta}_{1} \sin (\theta_{2}) \sin (\theta_{3}) + 0.5 I_{xx,4} \dot{\theta}_{1} \sin (2.0 \theta_{3}) \sin (2.0 \theta_{4}) \cos (\theta_{2}) - 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) + 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) + 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \sin (\theta_{2}) \sin (\theta_{3}) + 0.5 I_{xx,4} \dot{\theta}_{1} \sin (2.0 \theta_{3}) \sin (2.0 \theta_{4}) \cos (\theta_{2}) + 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) + 0.5 \operatorname{lc}_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \sin (2.0 \theta_{3}) \sin
0.5 I_{\text{vv},4} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} + 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} \sin{(2.0\,
0.5 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.125 a_3^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) + 0.00 \log_{4.2}^{2} m_4
0.5 a_3^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 a_3^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{10}^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 \log_{10}^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) - 0.5 \log_{10}^2 m_3 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{10}^2 m_3 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{10}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_2) + 0.5 \log_{10}^2 m_3 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_3) \cos(\theta_3)
1.0 I_{\text{xy},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} - 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 1.0 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_2 \cos{(2.0\,\theta_3)} - 1.0 \log_{3.2} m_3 \dot{\theta}_3 \cos{(2.0\,
0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_4) \sin(2.0 \theta_5) 
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_
0.5 \, a_3 \, \log_{11} m_3 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 5 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2.0 \, \theta_5) + 1.0 \, I_{\text{NV}} \, 6 \, \dot{\theta}_5 \, \cos(2
1.0 I_{xy.5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx.5} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 I_{yy.5} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.5 I_{yy.5} \dot{\theta}_3 \sin(2.0 \theta_5) 
1.0 I_{\text{vz},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 I_{\text{xz},4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + 1.0 I_{\text{xz},4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 I_{\text{vz},4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_4) + 1.0 I_{\text{xz},4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) \sin(\theta_4) + 1.0 I_{\text{xz},4} \dot{\theta}_1 \cos(\theta_4) + 1.0 I_{\text{xz},4} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 1.0 I_{\text{xz},4} \dot{\theta}_1 \cos(\theta_
0.5 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{10} m_3 \dot{\theta}_1 \cos(\theta_2) - 0.5 a_3 \log_{10} m_3 \dot{\theta}_2 \cos(\theta_2) - 0.5 a_3 \log_{10} m_3 \dot{\theta}_3 \cos(\theta_2) - 0.5 a_3 \log_{10} m_3 \cos(\theta_2) - 0.5 a_3 \log_{10} m_3 \dot{\theta}_3 \cos(\theta_2) - 0.5 a_3 \log_{10} m_3 \dot{\theta}_
1.0 a_2 lc_{3,1} m_3 \dot{\theta}_2 \cos(\theta_3) - 0.5 a_4 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) + 1.0 I_{xv,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 1.0 I_{xv,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 1.0 I_{xv,4} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta
1.0 I_{\text{xv},4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) + 1.0 a_2 \log_{3.2} m_3 \dot{\theta}_2 \sin(\theta_3) - 0.125 a_4^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 a_4^2 \sin(\theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.5 \, a_4^2 \,
1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_4
0.5 a_4 lc_{4,2} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 1.0 lc_{4,1} lc_{4,2} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 ic_{xx,5} dc_{xx,5} dc_{xx,5}
0.5\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\cos{(\theta_2)} + 0.5\,a_3\,\mathrm{lc}_{3.1}\,m_3\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_2)} - 1.0\,a_3\,\mathrm{lc}_{4.2}\,m_4\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_4)} - 1.0\,a_3\,\mathrm{lc}_{4.2}\,m_4\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.5\,a_3\,\mathrm{lc}_{3.1}\,m_3\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_2)} + 0.5\,a_3\,\mathrm{lc}_{3.1}\,m_3\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) - 0.0 \, a_4 \, a_4 \, a_5 \, a_4 \, a_5 \, a
1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta
1.0 I_{\text{xv},5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_3 \log_{3.2} m_3 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_2) - 1.0 a_3 \log_{4.1} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_4) - 0.5 \log_{10} m_4 \sin(2.0 \theta_3) \cos(\theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, 
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 1.0 \log_{11} \log_{12} m_3 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 I_{xx} = 5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{xx} = 5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{xx} = 0.5 in(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 in(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_4) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(2.0 \,\theta_5) \cos
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 1.0 a_3 l_{\text{c}_{4,2}} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(\theta_4)} + 0.5 l_{\text{c}_{5,1}}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 1.0 a_3 l_{\text{c}_{4,2}} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(\theta_4)} + 0.5 l_{\text{c}_{5,1}}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 1.0 a_3 l_{\text{c}_{4,2}} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(\theta_4)} + 0.5 l_{\text{c}_{5,1}}^2 m_5 \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 1.0 a_3 l_{\text{c}_{4,2}} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 1.0 a_3 l_{\text{c}_{4,2}} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} 
0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.5 \log_{11} 2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 0.5 \log_{12} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_5) - 0.5 \log_{12} 2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 
0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) + 1.0 I_{xy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_
1.0 I_{xz.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 1.0 I_{yz.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 I_{yz.5} \dot{\theta}_2 \sin(\theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 I_{yz.5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{yz.5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{yz.5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 I_{yz.5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 I_{yz.5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
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1.0 I_{\text{vz},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 I_{\text{vz},5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.5 l_{5,1}^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 1.0 I_{5,1}^2 \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0
0.5 \log_{10} 2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_3 \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_4 \cos(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) - 
1.0 I_{xz} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_3 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) - 0.5 a_3 a_4 m_4 \dot{\theta}_3 \cos(\theta_4) - 0.5 a_3 a_4 m_4 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) - 1.0 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, I_{vz,5} \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 1.0 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, I_{vz,5} \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, I_{vz,5} \, \dot{\theta}_4 \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 1.0 \, I_{vz,5} \, \dot{\theta}_4 \, \sin(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \,
1.0 a_2 \log_{12} m_3 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) - 1.0 a_3 \log_{11} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) - 1.0 a_2 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) + 1.0 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) - 1.0 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) + 1.0 \log_{11} m_4 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) - 1.0 \log_{11} m_4 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) + 1.0 \log_{11} m_4 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, a_2 \, \mathrm{lc}_{3,1} \, m_3 \, \dot{\theta}_1 \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2
1.0 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, \dot{\theta}_3 \, d_5 \, d_5 \, \dot{\theta}_3 \, d_5 \, d
0.5 a_2 a_4 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) + 1.0 a_2 a_4 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \sin(\theta_3) \sin(\theta_4) + 0.5 \ln_{4,1}^2 m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_3) \cos(2.0 \theta
0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 1.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) - 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) + 0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 1.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) - 0.5 a_3 \log_{3.3} m_3 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) + 0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.0 \log_{3.2} \log_{3.3} m_3 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) - 0.5 \log_{3.3} m_3 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) + 0.5 \log_{3.3} m_3 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3
1.0 \, a_2 \, \mathrm{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4 \, 3} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.125 \, a_4^{\, 2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.125 \, a_4^{\, 2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.125 \, a_4^{\, 2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, 
0.5 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 \log_{3.1} \log_{3.3} m_3 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{3.1} \log_{3.2} m_3 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) - 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.0 \log_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_4) 
0.5 \operatorname{lc}_{4} \operatorname{2}^{2} m_{4} \dot{\theta}_{1} \sin{(2.0 \,\theta_{3})} \sin{(2.0 \,\theta_{4})} \cos{(\theta_{2})} - 0.5 \, a_{4} \operatorname{lc}_{4} \operatorname{2} m_{4} \dot{\theta}_{2} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{4})} - 1.0 \, a_{4} \operatorname{lc}_{5} \operatorname{2} m_{5} \dot{\theta}_{2} \sin{(2.0 \,\theta_{3})} \sin{(2.0 \,\theta_{4})} \sin{(\theta_{5})} + 0.5 \operatorname{lc}_{4} \operatorname{2}^{2} m_{4} \dot{\theta}_{1} \sin{(2.0 \,\theta_{3})} 
0.5\,a_3\,a_4\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_2)}\,\cos{(\theta_4)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_2)}\,\cos{(\theta_4)} - 0.5\,a_3\,a_5\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)} + 1.0\,a_3\,a_4\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)} + 1.0\,a_3
1.0 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, 
1.0 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d
1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)}
1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a_5 \, d_5 \, \cos(\theta_5) \, d_5 \, d
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, \mathrm{lc}_{5,1}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, \mathrm{lc}_{5,2}{}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)}
1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} 
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \,
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.0 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.5 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) +
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.5 a_5 \log_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) +
0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} - 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0
0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.5 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_4) - 1.0 a_2 \log_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) + 0.0 \log_4 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_4 \, a_5 \, a_5
0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) - 1.0 a_2 a_4 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, a
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 1.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} - 1.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 1.0 \, \mathrm{lc}_{5,2} \, \mathrm{lc}_{5,3} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} + 1.0 \, \mathrm{lc}_{5,3} \, \mathrm{
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4)
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta
1.0 a_2 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 1.0 a_2 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 1.0 lc_{4,2} lc_{4,3} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 lc_{4,2} lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{4,3} m_4 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{4,3} m_4 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) + 1.0 lc_{4,2} lc_{4,3} m_4 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{4,2} lc_{4,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{4,2} lc_{4,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 lc_{4,2} lc_{4,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 lc_{4,2} lc_{4,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
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1.0 a_2 \ln a_2 \ln a_4 \theta_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4 \ln a_3 m_4 \theta_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 0.5 a_4 \ln a_4 \theta_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 0.5 a_4 \ln a_4 \theta_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \sin(\theta
1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_
1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d^{-1} \, 
0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 \lg_4 \lg_4 a_3 m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 1.0 \lg_4 \lg_4 a_3 m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 \lg_4 \lg_4 a_5 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) \sin(
1.0 a_2 \ln a_1 \ln a_2 \ln a_3 \ln a_4 \ln 
0.5 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 1.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, 
0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) + 1.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) + 1.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 1.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + 1.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + 1.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_5) + 1.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin
1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos (2.0 \, \theta_4) \, \sin (2.0 \, \theta_3) \, \cos (\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos (2.0 \, \theta_3) \, \sin (2.0 \, \theta_4) \, \sin (\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos (2.0 \, \theta_4) \, \sin (2.0 \, \theta_3) \, \sin (\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos (2.0 \, \theta_4) \, \sin (2.0 \, \theta_3) \, \sin (\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos (2.0 \, \theta_4) \, \sin (2.0 \, \theta_3) \, \cos (2.0 \, \theta_3) \, \sin (2.0 \, \theta_3) \, \cos (2.
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_5) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) - 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) + 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) + 1.0 \, \log_4 \, \log(2.0 \, \theta_3) \, \cos(\theta_2) + 1.0 \, \log(2.0 \, \theta_3) 
0.5 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 1.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, a_5 \, \dot{\theta}_5 
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, d
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \,
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta
0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 1.0 \log_{11} \log_{12} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) +
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(2.0
0.5 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 a_2 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \cos
0.5 a_5 \log_2 a_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 a_2 \log_2 a_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 \log_2 a_5 \sin(\theta_5) \cos(\theta_5) \cos(\theta
1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, m_5 \, d_5 \, 
1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,2} m_5 \dot{\theta}
1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_1 \log_3 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 1.0 \log_1 \log_3 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta
1.0 \log_{11} \log_{12} \hat{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_4 \log_{12} m_5 \hat{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \cos(\theta_5) -
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 2} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 3} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 3} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_5) \, - 1.0 \, \mathrm{lc}_{5 \, 3} \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, m_5 \, \dot{\theta}_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, m_5 \, \dot{\theta}_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, m_5 \, \dot{\theta}_
1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
1.0 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} \, d
1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} 
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} \, d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (A39)
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```
C_{33} = a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} - 1.0 \, a_3 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \,
```

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C_{34} = 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} - 1.0 \, a_3 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_4 \, \cos{(\theta_4)} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_4 \, \sin{(\theta_4)} - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} - 1.0 \, a_3 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin{(\theta_4)} - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{
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C_{35} = 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_2)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_3 \, \text{lc}_{5,
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C_{41} = -0.25 I_{xy,4} \dot{\theta}_1 - 0.25 I_{xy,5} \dot{\theta}_1 - 0.5 I_{xy,4} \dot{\theta}_1 \cos(\theta_2)^2 + 0.5 I_{xy,4} \dot{\theta}_1 \cos(\theta_3)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 +
    0.5 I_{\text{xv},4} \dot{\theta}_1 \cos(\theta_4)^2 + 0.5 I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_4)^2 + 0.5 I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 I_{\text{zz},4} \dot{\theta}_2 \cos(\theta_2) - 0.5 I_{\text{zz},4} \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 I_{\text{xv},5} \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 I_{\text{xv},5} \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 I_{\text{xv},5} \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 I_
    0.5 I_{zz.5} \dot{\theta}_2 \cos(\theta_2) + 0.25 I_{xy.4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) + 0.125 a_4 lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_1 + 0.25 lc_{4.1} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 a_5 lc_{5.2} m_5 \dot{\theta}_2 + 0.125 lc_{4.2} lc_{4.2} m_4 \dot{\theta}_1 + 0.125 lc_{4.2} lc_{4.2} m_5 \dot{\theta}_2 + 0.125 lc_{4.2} l
    0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 + 0.125 I_{xx,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 I_{xx,4} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} - 0.125 I_{yy,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.125 I_{yy,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 I_{xx,4} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 I_{xx,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} + 0.125 I_{xx,4} \dot{\theta}_1 \cos{(2.0\,\theta_4)} + 0.125 I_{xx,4} \dot{\theta}_1 \cos{
0.125\,I_{yy,4}\,\dot{\theta}_{1}\,\cos{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{3})} - 0.25\,I_{xy,4}\,\dot{\theta}_{1}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})} + 1.0\,I_{xy,4}\,\dot{\theta}_{1}\cos{(\theta_{2})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,4}\,\dot{\theta}_{1}\cos{(\theta_{2})}^{2}\cos{(\theta_{4})}^{2} + 1.0\,I_{xy,4}\,\dot{\theta}_{1}\cos{(\theta_{2})}^{2}\cos{(\theta_{3})}^{2} - 1.0\,I_{xy,4}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2}\cos{(\theta_{4})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{2})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{2})}^{2}\cos{(\theta_{3})}^{2} - 1.0\,I_{xy,4}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{2})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{3})}^{2} + 1.0\,I_{xy,5}\,\dot{\theta}_{1}\cos{(\theta_{
    1.0\,I_{\text{xv},5}\,\dot{\theta}_{1}\cos{(\theta_{3})^{2}}\cos{(\theta_{4})^{2}}-1.0\,I_{\text{xv},5}\,\dot{\theta}_{1}\cos{(\theta_{3})^{2}}\cos{(\theta_{5})^{2}}-1.0\,I_{\text{xv},5}\,\dot{\theta}_{1}\cos{(\theta_{4})^{2}}\cos{(\theta_{5})^{2}}-0.125\,a_{4}^{2}\,m_{4}\,\dot{\theta}_{2}\cos{(\theta_{2})}-0.125\,a_{4}^{2}\,m_{4}\,\dot{\theta}_{2}\cos{(\theta_{2})}
    0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_2) - 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) - 0.25 I_{xx} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.00 \sin(\theta_2) \sin(\theta
    0.25 I_{xx,4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta
    0.25\,I_{\text{xx}.5}\,\dot{\theta}_{1}\,\cos{(\theta_{5})}\sin{(\theta_{5})} + 0.25\,I_{\text{vv}.4}\,\dot{\theta}_{1}\,\cos{(\theta_{2})}\sin{(\theta_{2})} + 0.25\,I_{\text{vv}.5}\,\dot{\theta}_{1}\,\cos{(\theta_{2})}\sin{(\theta_{2})} - 0.25\,I_{\text{yv}.4}\,\dot{\theta}_{1}\,\cos{(\theta_{3})}\sin{(\theta_{3})} - 0.25\,I_{\text{vv}.5}\,\dot{\theta}_{1}\,\cos{(\theta_{3})}\sin{(\theta_{3})} + 0.25\,I_{\text{vv}.5}\,\dot{\theta}_{2}\cos{(\theta_{3})}\sin{(\theta_{3})} + 0.25\,I_{\text{vv}.5}\,\dot{\theta}_{1}\cos{(\theta_{3})}\sin{(\theta_{3})} + 0.25\,I_{\text{vv}.5}\,\dot{\theta}_{2}\cos{(\theta_{3})}\sin{(\theta_{3})} + 0.25\,I_{\text{vv}.5}\,\dot{\theta}_{3}\cos{(\theta_{3})}\sin{(\theta_{3})} + 0.25\,I_{\text{vv}.5}\,\dot{\theta}_{
    0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{\text{yy},4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{\text{yy},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{\text{yy},5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 0.25 I_{\text{yy},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_
    0.5 \log_{4.1}^{2} m_{4} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{4.2}^{2} m_{4} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) - 0.5 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) + 0.5 I_{\text{xx},4} \dot{\theta}_{2} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \cos(\theta_{2}) - 0.5 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) + 0.5 I_{\text{xx},4} \dot{\theta}_{2} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \cos(\theta_{2}) - 0.5 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) + 0.5 I_{\text{xx},4} \dot{\theta}_{2} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{4}) \cos(\theta_{2}) - 0.5 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{2}) + 0.5 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \sin(2.0 \theta_{3}) \sin(2.0 \theta_{3}
    0.5 I_{\text{vv},4} \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_1 \cos{(2.0\,\theta_3)} + 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} - 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_4)} - 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_4)} - 0.125 \log_{4,1}{}^2 m_4 \dot{\theta}_2 \sin{(2.0\,\theta_4)} - 0.125 \log_{4,1}{}^2 \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_4)} + 0.125 \log_{4,1}{}^2 \sin{(2.0\,\theta_4)} \sin{(2.
    0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) + 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) + 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) + 0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_3) \cos
    0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{xx,6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 I_{xx,6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{xx,6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.5 I_{xx,6} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3) + 0.5 I_{xx,6} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3) + 0.5 I_{xx,6} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3)^
    0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{xx.4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_
    0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \sin(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2
    0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2
    0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) + 0.5 I_
    0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{yy} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{yy} = \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_5) - 0.5 I_{yy} = \dot{\theta}_1 \cos(\theta_5) + 0.5 I_{yy} = \dot{\theta}_2 \cos(\theta_5) + 0.5 I_{yy} = \dot{\theta}_3 \cos(\theta_5) + 0.5 I_{yy} = \dot{\theta}_1 \cos(\theta_5) + 0.5 I_{yy} = \dot{\theta}_2 \cos(\theta_5) + 0.5 I_{yy} = \dot{\theta}_3 \cos(\theta_5) 
    0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{\text{vv},7} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{\text{vv},8} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{\text{vv},8} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta
    0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos
    0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},6} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0
    0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
    0.5 I_{\text{VV}} = 5 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)} + 0.5 I_{\text{VV}} = \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} 
    0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 I_{\text{xv.}4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(\theta_2)^2} + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{\text{vv.}5} \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{\text{vv.}5} \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta
    0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 - 0.25 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.25 \, a_5 \, \mathrm{lc}_{5,2} \, m_5
    0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 \log_4 \log_4 \theta_1 \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 + 0.25 \log_4 \theta_1 \cos(\theta_3)^2 + 0.25 \log_4 \theta_2 \cos(\theta_3)^2 + 0.25 \log_4 \theta_1 \cos(\theta_3)^2 + 0.25 \log_4 \theta_2 \cos(\theta_3)^2 + 0.25 \log_4 \theta_3 \cos(\theta_3)^2 + 0.25 
    0.5 \, \text{lc}_{4\,1} \, \text{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 - 0.5 \, \text{lc}_{4\,1} \, \text{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 + 0.5 \, \text{lc}_{5\,1} \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 - 0.5 \, \text{lc}_{5\,1} \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 - 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 + 0.5 \, \text{lc
    0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4)^2 - 0.5 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0\theta_3) \sin(2.0\theta_4) \cos(\theta_2)^2 - 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0\theta_4) \sin(2.0\theta_3) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0\theta_4) \sin(2.0\theta_4) \sin
    0.25 I_{\text{vv},4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.5 I_{\text{xz},4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 I_{\text{vv},4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta
    0.5 I_{xx,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 I_{yz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 I_{yz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) + 0.5 I_{yz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 I_{yz,4} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{yz,4} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{yz,4} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{yz,4} \dot{\theta}_3 \sin(\theta_4) + 0.5 I_{yz,4} \dot{\theta}_4 \sin(\theta_4) + 0.5 I_{yz,4} \dot
    0.5 I_{xz,4} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) - 0.125 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_3 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_4 \cos(2.0 \theta_5) - 0.125 I_{xy,5} \dot{\theta}_5 \cos(2.0 \theta
    0.125 I_{xx.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} - 0.125 I_{xx.5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.125 I_{yy.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{yy.5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} 
    0.125 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} + 0.25 I_{\text{xv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{
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0.25 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.25 I_{xx,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.125 I_{xx,5} \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} - 0.25 I_{xx,5} \dot{\theta}_1 \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(
0.125 I_{\text{vv},5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 1.0 I_{\text{vz},4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 0.0625 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_2) + 0.0625 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_2) + 0.0625 a_4^2 m_4 \dot
0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, 
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \cos
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 I_{xy,4} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_5)}^2 
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 + 2
1.0 I_{xz,4} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + 1.0 I_{xz,4} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 0.25 lc_{4,1}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.00 lc_{4,1} \sin(\theta_4) \sin(\theta_
0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{4.1}{}^2 \sin{(\theta_4)} + 0.25 \log_{4.1}{}^2
0.25 \log_{4,2}{}^2 m_4 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 
0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0
0.25 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 I_{vz} \dot{\theta}_{2} \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) - 0.5 I_{xx} \dot{\theta}_{2} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \cos(\theta_{2}) + 0.00 \log(2.0 \theta_{4}) \cos(2.0 \theta_{
0.5 I_{\text{vv},4} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4 \ln_4 m_4 \dot{\theta}_2 \cos(\theta_2) + 0.75 a_3 \ln_4 m_4 \dot{\theta}_1 \cos(\theta_4) - 0.5 a_5 \ln_5 m_5 \dot{\theta}_2 \cos(\theta_2) + 0.75 a_5 \ln_5
0.375 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} + 0.75 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} + 1.0 \, I_{xv,4} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{
0.75 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \sin{(\theta_4)} - 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} - 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4^{\,2} \, m_4 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} + 0.03125 \, a_4
0.125 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} - 0.125 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} - 0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(1.0 \, \theta_4)} + 0.000 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, 
0.0625 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(1.0 \, \theta_4) \, \sin(2.0 \, \theta_2) - 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(1.0 \, \theta_4) + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(1.0 \, \theta_4) \, \sin(2.0 \, \theta_2) - 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_2) + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) + 0.125 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_2) + 0.125 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_2) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_2) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_2) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_2) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_2) + 0.125 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_2) \, \dot{\theta}_5 \, \dot{\theta
0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}{}^2 \, \sin{(\theta_2)} - 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}{}^2 \, \sin{(\theta_2)} - 0.5 \, \text{lc}_{4,1}{}^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + \frac{1}{2} \, \sin{(\theta_2)} + \frac{1}{2} \, \cos{(\theta_2)} + \frac{1}{2} \, \sin{(\theta_2)} + \frac{1}{2} \, \cos{(\theta_2)} + \frac{1}{2} \, \sin{(\theta_2)} + \frac{1}{2} \, \cos{(\theta_2)} + \frac{1}{2} \, \cos{(\theta_2
0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \sin (\theta_{2}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{4})^{2} \sin (\theta_{2}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3}) + 0.5 \operatorname{lc}_{4,2}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \sin (\theta_{3
0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3}) \cos (\theta_{4})^{2} \sin (\theta_{3}) - 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) - 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{3})^{2} \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{4})^{2} \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{4})^{2} \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{4})^{2} \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} m_{4} \dot{\theta}_{1} \cos (\theta_{4})^{2} \sin (\theta_{4}) + 0.5 \operatorname{lc}_{4,1}{}^{2} \sin (\theta_{4})^{2} \sin (\theta_{4})^{2}
0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} - 0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_4)^2} \sin{(\theta_4)} - 0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_4)^2} \sin{(\theta_4)} - 0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} - 0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} - 0.5 \lg_{4,2}{2} m_4 \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_4)^
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_2)} + 0.5 \log_{
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_4)} \cos{(\theta_4
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(
0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{^2} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} \cos{(\theta_5)} 
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_4)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_5)} \cos{(\theta_5)} 
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \sin{(\theta_5)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2
0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{^2} \cos{(\theta_5)} 
0.25 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) - 0.125 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(1.0 \theta_4) + 0.125 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(1.0 \theta_4) \sin(2.0 \theta_2) - 0.125 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(1.0 \theta_4) + 0.125 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_2) \theta_2) \cos(2.0 \theta
0.125 \, a_4 \, lc_4 \, lm_4 \, \dot{\theta}_1 \, cos \, (2.0 \, \theta_3) \, sin \, (2.0 \, \theta_4) - 0.125 \, a_4 \, lc_4 \, lm_4 \, \dot{\theta}_1 \, cos \, (2.0 \, \theta_4) \, sin \, (2.0 \, \theta_3) - 0.125 \, a_3 \, lc_4 \, lm_4 \, \dot{\theta}_1 \, sin \, (2.0 \, \theta_2) \, sin \, (1.0 \, \theta_4) + 0.000 \, lm_4 \,
0.125 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.25 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.5 \, I_{\mathrm{vz},5} \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.25 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} + 0.25 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} + 0.25 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} + 0.25 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)
0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2
0.25 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 + 0.5 \, I_{xz,5} \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, I_{xz,5} \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, I_{xz,5} \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, I_{xz,5} \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 0.5 \, I_{xz,5} \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(2.0 \, \theta_2)} \, \cos{(2.
0.5 I_{xz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 lc_{4.1}^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(
0.25 \log_4 2^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 \log_4 2^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 1.0 I_{xx} 4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 \log_4 2^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 0.25 \log_4 2^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 \log_4 2^2 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) \cos(\theta_4) \cos(\theta_4
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1.0 I_{xx,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 1.0 I_{xx,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{yy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) + 1.0 I_{yy,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \sin(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2
1.0 I_{yy,4} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + 1.0 I_{yy,4} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + 1.0 I_{yy,4} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \sin{(\theta_4)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \sin{(\theta_4)^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_4)^2} \cos{(\theta_4)^2} \cos{(\theta_
1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3
1.0 I_{vv,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_5)^2} \sin{(\theta_3)} + 1.0 I_{vv,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 I_{vv,5} \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)^2} \sin{(\theta_3)} + 1.0 I_{vv,5} \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_3)} + 1.0 I_{vv,5} \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \sin{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(
1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos
1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_3 \sin(\theta_4) \sin(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_4 \sin(\theta_5) - 0.5 I_{\text{vz},5} \dot{\theta}_5 \sin(\theta_5) - 0.5
0.5 I_{\text{vz},5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_5)} - 0.5 I_{\text{vz},5} \dot{\theta}_1 \sin{(2.0\,\theta_2)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.125 a_3 a_4 m_4 \dot{\theta}_2 \cos{(1.0\,\theta_4)} \cos{(\theta_2)} - 0.00 \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_4) \, \cos(\theta_2) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(1.0 \, \theta_4) \, \cos(\theta_2) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_4) \, \cos(\theta_2) + 0.00 \, a_4 \, a_5 
0.5 I_{\text{xx},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5) \cos
0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_3 \log_{4.1} m_4 \dot{\theta}_2 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 \log_{4.1} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_4) \cos(\theta
0.125 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(0.0 \, \theta_5)} \,
0.5 a_4 \log_2 m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) - 0.0625 a_3 a_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) - 0.0625 a_3 a_4 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.0625 a_5 a_5 \cos(0.0 \theta_2) \cos(0.0 \theta_2) \sin(0.0 \theta_3) \cos(0.0 \theta_4) \cos(0.0 \theta_2) \sin(0.0 \theta_3) \cos(0.0 \theta_4) \cos(
0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) - 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_4) - 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_4) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_4) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_4) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_4) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_4) + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \dot{
0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_2) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) - 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_5 
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \dot{\theta}_5 \, \dot
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{xv},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, 
1.0 I_{xy,5} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) - 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) + 0.125 a_3 l_{4.1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0
0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(1.0 \, \theta_4)} \, \sin{(\theta_2)} \, d_4 \, 
0.25 a_3 lc_{4,2} m_4 \dot{\theta}_2 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \sin(\theta_2) + 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \sin(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) \cos(\theta_2) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_3 \cos(1.0 \theta_4) 
0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) - 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.5 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(1.0 \, \theta_5) \, d_5 \, d_
0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_4)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin{(0.0 \, \theta_4)} \, \cos{(0.0 \, \theta_4)} \, \cos
0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(1.0 \, \theta_4) \, \sin(\theta_2) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_4) \, \sin(\theta_2) + 0.03125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) + 0.00125 \, a_5^2 \, a
0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) -
0.5\,I_{\text{xx},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.5\,I_{\text{xx},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.5\,I_{\text{xx},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.5\,I_{\text{xx},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.5\,I_{\text{xx},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} - 0.5\,I_{\text{xx},5}\,\dot{\theta}_2\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,\cos{(2.0\,\theta_5)}\,
0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{yy,5} \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) + 0.5 I_{yy,5} \dot{\theta}_5 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 - 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_4)^2 + 0.5 a_4 lc_{4,2} m_4 \dot{\theta}
0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 - 0.5 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5)^2 + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 + 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta
0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 0.5 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 0.5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 0.5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 0.5 \log_{12} m_5 \dot{\theta}_3 \cos(\theta_5)
0.25 a_3 \ln a_4 m_4 \dot{\theta}_2 \sin (1.0 \theta_4) \sin (\theta_2) - 0.5 a_3 \ln a_4 m_4 \dot{\theta}_3 \sin (1.0 \theta_4) \sin (\theta_2) + 0.125 a_3 \ln a_4 m_4 \dot{\theta}_1 \sin (2.0 \theta_2) \sin (\theta_4) - 0.125 a_3 \ln a_4 m_4 \dot{\theta}_2 \sin (1.0 \theta_4) \sin (\theta_4) + 0.125 a_3 \ln a_4 m_4 \dot{\theta}_3 \sin (1.0 \theta_4) \sin (\theta_4) + 0.125 a_3 \ln a_4 m_4 \dot{\theta}_4 \sin (1.0 \theta_4) \sin (\theta_4) + 0.125 a_3 \ln a_4 m_4 \dot{\theta}_4 \sin (1.0 \theta_4) \sin (\theta_4) + 0.125 a_3 \ln a_4 m_4 \dot{\theta}_4 \sin (1.0 \theta_4) \sin (\theta_4) + 0.125 a_3 \ln a_4 m_4 \dot{\theta}_4 \sin (1.0 \theta_4) \sin (\theta_4) + 0.125 a_3 \ln a_4 m_4 \dot{\theta}_4 \sin (1.0 \theta_4) \sin (1.0 
0.25 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(0.0 \, \theta_5)} \, \sin{(0.0 
0.125 \lg_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 \lg_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} + 0.125 \lg_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_4)} + 0.125 \lg_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)
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0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{4})} \sin{(2.0 \,\theta_{5})} - 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{3})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{4})} - 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} - 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} - 0.125 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \cos{(2.0 \,\theta_{5})} \sin{(2.0 \,\theta_{5})} \sin{(2.
1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 - 1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 + 1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 - 1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 + 1.0 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_4)^2 + 1
1.0 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 - 1.0 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 - 1.0 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5)^2 + \frac{1}{2} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + \frac{1}{2} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 + \frac{1}{2} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 + \frac{1}{2} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 1.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 1.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 1.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 1.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 1.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 1.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5
1.0\,I_{\text{xy},5}\,\dot{\theta}_2\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)}\,\cos{(\theta_2)} + 1.0\,I_{\text{xz},5}\,\dot{\theta}_2\,\cos{(\theta_3)}\,\cos{(\theta_4)}\,\cos{(\theta_5)}\,\sin{(\theta_2)} - 0.03125\,a_5{}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.03125\,a_5{}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} + 0.03125\,a_5{}^2\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.
1.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) - 1.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_
1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 1.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 1.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) + 1.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) + 1.0 I_{xy,5} \dot{
1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 
1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_5 \cos(\theta_5) - 1.0 I_{vz,5} \dot{\theta}_5 \cos(
0.125 \log_{10}^{2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 \log_{10}^{2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_4 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_3) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) + 1.0 I_{x
1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_3 \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) - 0.25 a_2 a_4 m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_5) \cos
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \cos(\theta_4) + 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.5 \, I_{\text{xv},5} \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(2.0 
1.0 I_{\text{vz},5} \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{11} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) - 0.25 a_3 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_4) + 0.25 a_3 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{11} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) - 0.25 a_3 \log_{11} m_4 \dot{\theta}_2 \cos(\theta_4) + 0.25 a_3 \log_{11} m_4 \dot{\theta}_3 \cos(\theta_4) \cos
0.5 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_4)} + 0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_5 \, 
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_5) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_2) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \sin(\theta_3) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \dot{\theta}_5 \, \cos(\theta_3) \, \dot{\theta}_5 \,
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 + 0.25 \, I_{\text{xx},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} -
0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 0.25 I_{xx,4} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) -
0.25 I_{vv,4} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_4 lc_{4.1} m_4 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 a_2 lc_{4.2} m_4 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_4)} + 0.25 a_4 lc_{4.1} m_4 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 a_4 lc_{4.2} m_4 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_4)} + 0.25 a_4 lc_{4.1} m_4 \dot{\theta}_1 \cos{(\theta_4)} + 0.25 a_4 lc_{4.2} m_4 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 a_4 lc_{4.2} m_4 \dot{\theta}_1 \cos{(\theta_4)} \cos
0.5 a_2 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) - 0.25 a_4 \ln_{4.1} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 a_3 \ln_{4.2} m_4 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) + 0.25 a_3 \ln_{4.2} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) - 0.25 a_4 \ln_{4.1} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 a_3 \ln_{4.2} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.25 a_4 \dot{\theta}_4 \sin(\theta_4) + 0.25 a_4
0.5 a_3 \ln a_4 2 m_4 \dot{\theta}_3 \cos(\theta_2) \sin(\theta_4) - 0.5 a_3 \ln a_4 2 m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_2) - 0.25 a_4 \ln a_4 m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.25 a_4 \ln a_4 m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.25 a_4 \ln a_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln a_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.25 a_4 \ln a_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln a_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln a_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln a_5 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_4) \sin(\theta_5) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.25 a_5 \ln a_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.75 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.00 \, \sin{(\theta_5)} + 0.00 \, \sin
0.75 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.25 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \,
0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_2) \, \sin(\theta_4) - 0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_2) \, \sin(\theta_4) - 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \dot{\theta
0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{4.2}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 \log_{4.1}^2 m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta
0.5 I_{xy,4} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{xy,4} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.5 a_2 lc_{4,1} m_4 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) + 0.5 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.5 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4) + 0.5 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_4
0.25 \, a_3 \, \text{lc}_{4\,1} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \text{lc}_{4\,1} \, m_4 \, \dot{\theta}_3 \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 0.75 \, a_3 \, \text{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_4 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \text{lc}_{5\,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 0.5 \, a_5 \, 
0.5 a_4 \log_{10} a_5 \sin(\theta_2) \sin(\theta_5) - 0.125 a_4^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) - 0.5 a_4^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_5 \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_5 \sin(\theta_5) \cos(\theta_5) 
0.25\,I_{\text{xx}.5}\,\dot{\theta}_{1}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})}\,\cos{(\theta_{2})}^{2}+0.25\,I_{\text{yy},5}\,\dot{\theta}_{1}\,\sin{(2.0\,\theta_{3})}\,\sin{(2.0\,\theta_{4})}\,\sin{(2.0\,\theta_{5})}\,\cos{(\theta_{2})}^{2}-
0.25 I_{xx,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,4} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.5 I_{c_{4,1}}^2 m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_3 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{c_{4,2}} \dot{\theta}_4 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(2.0 \theta_4) \cos(2.0 
0.5 \lg_{4.2} m_4 \dot{\theta}_2 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.125 \, a_4^2 \, m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.125 \, a_4^2 \, m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.125 \, a_4^2 \, m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.125 \, a_4^2 \, m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.125 \, a_4^2 \, m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_2
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0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_2)}
0.5 a_4^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3)^
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)} 
0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 0.5 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_4^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_5^2 m_5 
0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)}^
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.125 a_3 lc_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(1.0 \theta_4) - 0.125 a_5 cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5) \cos(\theta_5)
0.125 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_3)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_3)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_3)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_3)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_3)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_3)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_{1.2} \, \cos{(\theta_3)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_3)} + 0.00 \, \mathrm{lc}_{4.2} \, \mathrm{l
0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, 
0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_2\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_4\right) + 0.5 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_4\right) - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_2\right) - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) + 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right) 
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_2 a_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.00 cos(\theta_5) \sin(\theta_5) + 0.00 cos(\theta_5) \sin(\theta_5) + 0.00 cos(\theta_5) \cos(\theta_5) 
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)} \, \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)}^2 + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)}^2 + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)}^2 + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)}^2 + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)}^2 + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)}^2 + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)}^2 + 0.125 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4
0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(\theta_4)} \cos{(\theta_4)}^2 \cos{(\theta_4)}
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0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta
0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_3)^2} \sin{(\theta_3)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_3)^2} \sin{(\theta_3)} + 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} 
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_4 \ln_{4,2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) \cos(\theta_5)^2 
0.5 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) - 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \cos
0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 1.0 \, \mathrm{lc}_{4.1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)}^2 \, \cos{(
1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + 1.0 \log_{4.1}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)} - 1.0 \log_{4.2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_3)^2} \cos{(\theta_3)^2} \cos{(\theta
1.0 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_2)} + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_2)} + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_3)}
1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) - 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \sin(\theta_{2}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{4})^{2} \sin(\theta_{2}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \sin(\theta_{2}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \sin(\theta_{2}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \sin(\theta_{3}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \sin(\theta_{3}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{3})^{2} \sin(\theta_{3}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{3})^{2} \sin(\theta_{3}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \sin(\theta_{3})^{2} \sin(\theta_{3}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \sin(\theta_{3})^{2} \sin(\theta_{3}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \sin(\theta_{3}) + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \sin(\theta_{3})^{2} \sin(\theta_{3})^
1.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 1.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} - 1.0 \log_{5,2}{}^2 \sin{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(\theta_5)
\frac{1.0 \log_{3,1} m_3 v_1 \cos (v_2) \cos (v_3) \cos (v_3) \sin (v_3) + 1.0 \log_{3,1} m_3 v_1 \cos (v_2) \cos (v_3) \cos (v_4) \sin (v_4) - 1.0 \log_{3,2} m_5 \dot{v}_1 \cos (v_2) \cos (v_3) \cos (v_3) \sin (v_2)}{1.0 \log_{3,2} 2 m_5 \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3) \cos (\theta_4)^2 \sin (\theta_3) - 1.0 \log_{3,2} 2 m_5 \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3) \cos (\theta_3) \cos (\theta_3) \sin (v_2)}
1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 1.0 \log_{5.1}{}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 1.0 \log_{5.1}{}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \log_{5.1}{}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \log_{5.1}{}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)
1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})^{2}} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})^{2}} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} - 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})} + 1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \sin{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{
1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) - 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{4}) - 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{5}) \sin (\theta_{5}) - 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_
1.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{5}) - 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{4}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5}) \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 1.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5
    1.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 0.125 a_{5}^{2} m_{5} \dot{\theta}_{2} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \cos(\theta_{2}) +
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0.5 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.00 \log_{10} \log
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \ln_4 m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(2.0 \theta_5) \cos(
0.25 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.5 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)}
0.5 a_3 lc_{4,2} m_4 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) - 0.5 a_3 lc_{4,2} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_4 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_5 lc_{4,3} m_4 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) + 0.25 a_5 lc_{4,3} m_4 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3
0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} - 0.00 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_{5.2} \, \mathrm{lc}_{5.2} \,
0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} 
0.25 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_3) \, \sin(\theta_4) - 0.25 \, a_5 \, \dot{\theta}_4 \, \cos(2.0 \, \theta_3) \, \cos(\theta_4) \, d\phi_4 \, d\phi_5 \, d\phi_6 \,
0.5 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, d_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, d_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, d_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, d_5 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, d_5 \, d_
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, \text{lc}_{5,1}^{\ 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.00 \, \sin{(\theta_5)} + 0.00 \, \sin{(\theta
0.5 \, \text{lc}_{5.2}{}^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,1} \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, + \, 0.5 \, \text{lc}_{4,3} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \,
0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.5 I_{xy.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,
0.5 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)^2} - 0.25 a_4 \ln_{4.2} m_4 \dot{\theta}_1 \sin{(2.0\,\theta_4)} \cos{(2.0\,\theta_4)} \cos{(2
0.5 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{4,1} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) + 0.25 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \sin(\theta_4) \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 
0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)} + 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5\,1}\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_5\,\dot{\theta}_1\,m_
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5)
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.1} \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 \ln_{4.2} m_4 \dot{\theta}_1 \sin(2.0 \theta_4) \cos(\theta_4) \cos(\theta_4)
0.5 \log_4 2 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 \log_4 2 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) + 0.25 I_{XX} 5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 \log_4 2 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 \log_4 2 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 \log_4 2 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_2 \sin(\theta_3) + 0.5 \log_4 3 m_4 \dot{\theta}_3 \sin(\theta_3) + 
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \sin(
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5
0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_3)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_3)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_3)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_1 \sin{(2.0 \,\theta_3)} \sin{(\theta_3)} \sin{(\theta_4)} - 0.25 a_4 \ln_{4,3} m_4 \dot{\theta}_2 \sin{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{
0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 
0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) + 0.5 \log_{1.1}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_
0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^{2} \cos(2.0 \theta_5) \cos(2.0 \cos(2.0 \theta_5
0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{4.1} \log_{4.3} m_4 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 I_{xy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 I_{xy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.25 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.25 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) + 0.25 \log_{11} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) + 0.25 \log_{11} m_5
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3
2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + \frac{1}{2} \cos(\theta_5) \cos(
0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) +
0.125 a_5 \log_{10} a_7 \log_{10} a_7 \log_{10} (2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 0.125 a_5 \log_{10} a_7 \log_{10} (2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{10} a_7 \log_{10} (2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos
0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5
1.0 a_2 lc_4 2 m_4 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) + 0.5 a_2 lc_5 2 m_5 \dot{\theta}_1 cos(\theta_3) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_2) cos(\theta_3) cos(\theta_4) cos(\theta_5) + 0.5 a_3 lc_5 2 m_5 \dot{\theta}_2 cos(\theta_3) cos(\theta_4) cos(\theta_5) co
0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 1.0 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} 
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, \dot{\theta}_5 \, \dot
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0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5
0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5.2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5.2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} - 0.25 \log_{5.2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2
0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) - 0.125 a_5 \log_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) +
1.0 \, a_1 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) - 1.0 \, a_2 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) - 1.0 \, a_2 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_4) \, d_4 \, d_
0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.
0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.0 \, \sin{(\theta_5)} + 0.
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)}^2 - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.
0.25 a_4^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 1.0 \log_{4.2} \log_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 a_4 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(
1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 
1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 1.0 a_1 \log_4 m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 1.0 a_1 \log_4 m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 1.0 \log_4 \log_4 m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \cos
1.0 \, a_2 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(\theta_2) \, \sin(\theta_4) - 0.5 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) - 0.5 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) - 0.5 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) - 0.5 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_4 \, \mathrm{lc}_{4\,3} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) \, d_4 \, d_
0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_
0.5 a_3 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 a_4 \ln c_5 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 1.0 a_4 \ln c_5 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 1.0 a_4 \ln c_5 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) \sin(\theta_
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \,
0.25 \, {\rm lc_{5}} \, {}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{3})} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{4})} \, \cos{(\theta_{2})^{2}} - 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{4})} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{3})} \, \cos{(\theta_{2})^{2}} + 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{3})} \, \cos{(\theta_{2})^{2}} + 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{3})} \, \cos{(\theta_{2})^{2}} + 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{3})} \, \cos{(\theta_{2})^{2}} + 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{3})} \, \cos{(\theta_{2})^{2}} + 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{3})} \, \cos{(\theta_{2})^{2}} + 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{3})} \, \cos{(\theta_{2})^{2}} + 0.25 \, {\rm lc_{5,1}}^{2} \, m_{5} \, \dot{\theta}_{1} \, \cos{(2.0 \, \theta_{5})} \, \sin{(2.0 \, \theta_{5})} \,
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) 
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.5 a_1 a_4 m_4 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_1 a_4 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_2 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_1 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_2 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_3 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_4 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_3 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_4 \sin(\theta_4) - 1.0 a_1 a_2 m_5 \dot{\theta}_5 \sin(\theta_5) - 1.0 a_2 m_5 \dot{\theta}_5 \sin(\theta_5) - 1.0 a_1 a_2 m_5 \dot{
0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 2.0 \log_{4.1}{\log_{4.2}{m_4 \,\dot{\theta}_1}} \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 2.0 \log_{5.1}{\log_{5.2}{m_5 \,\dot{\theta}_1}} \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 2.0 \log_{5.2}{m_5 \,\dot{\theta}_1} \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^
2.0 \log_{10} \log_{10} \log_{10} (\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} + 2.0 \log_{10} (\theta_{5})^{2} + 2.0 \log_{10} (\theta_{5})^{2} \cos(\theta_{5})^{2} - 2.0 \log_{10} (\theta_{5})^{2} - 2.0 \log_{10} (\theta_{5})^{2} \cos(\theta_{5})^{2} - 2.0 \log_{10} (\theta_{5})^{2} \cos(\theta_{5})^{2} + 2.0 \log_{10} (\theta_{5})^{2} \cos(\theta_{5})^{2} + 2.0 \log_{10} (\theta_{5})^{2} \cos(\theta_{5})^{2} + 2.0 \log_{10} (\theta_{5})^{2} \cos(\theta_{5})^{2} \cos(\theta_{5})^{2} + 2.0 \log_{10} (\theta_{5})^{2} \cos(\theta_{5})^{2} \cos
1.0 \log_{4.1} \log_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 1.0 \log_{4.1} \log_{4.3} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 a_1 \log_{4.1} m_4 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 \log_{4.1} \log_{4.1} m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 1.0 \log_{4.1} \log_{4.1} m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 1.0 \log_{4.1} \log_{4.1} m_4 \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) - 1.0 \log_{4.1} m_4 \dot{\theta}_4 \cos(\theta_4) 
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 a_3 \log_{11} m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 0.00 \cos(2.0 \theta_4) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.00 \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.00 \cos(2.0 \theta_5) \cos(
0.0625 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_4^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_4^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_4^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.0625 a_5^2 m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(
0.25 a_4^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 1.0 \log_{4.2} \log_{4.3} m_4 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + 1.0 \log_{4.2} \log_{4.3} m_4 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + 1.0 \log_{4.2} \log_{4.3} m_4 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{4.3} \log_{4.3} m_4 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{4.3} m_4 \dot{\theta}_3 \sin(\theta_4) + 2.0 \log_{4.3} m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{4.3} m_4 \dot{\theta}_4 \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos
2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_3) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta
2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) \sin
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) -
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + \frac{1}{2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + \frac{1}{2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_4 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}
0.25\,a_3\,\mathrm{lc}_{4,2}\,m_4\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)} + 0.5\,a_4\,\mathrm{lc}_{4,1}\,m_4\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(2.0\,\theta_4)}\cos{(
0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) + 0.125 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(2.0 
0.25 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) + 0.25 \, \mathrm{lc_{5 \, 1}}^2 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2)^2 -
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0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 \log_{4.1}^2 m_4 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \cos
0.25 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 \,a_3 \log_{4.1}{m_4} \dot{\theta}_1 \cos(2.0 \,\theta_2) \cos(2.0 \,\theta_3) \sin(\theta_4) + 0.25 \,a_3 \log_{4.1}{m_4} \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_3) \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_3) \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_3) \cos(2.0 \,\theta_3) \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_3) \cos(2.0 \,\theta_3)
0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, 
0.5 \, a_4 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 0.5 \, a_5 \,
0.25\,a_4\,a_5\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_5)} - 0.25\,a_4\,a_5\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)} - 1.0\,\mathrm{lc}_{4,1}\,\mathrm{lc}_{4,2}\,m_4\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_2)} - 0.25\,a_4\,a_5\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{
1.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) - 0.25 a_3 \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_4) - 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.25 a_3 \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_4) - 0.5 a_4 \log_{4.1} m_4 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.25 a_3 \log_{4.2} m_4 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.
0.5\,a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(\theta_5)} - 0.5\,a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_3)}\,\sin{(\theta_5)} - 0.5\,a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_3)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\cos{(\theta_5)} - 0.5\,a_4\,\mathrm{lc}_{5,1}\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_4)}\,\sin{
4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 
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0.5 a_2 \log_{10} a_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_3 \log_{10} a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_3 \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_5 \log_{10} a_5 \dot{\theta}_5 \cos(\theta_5) - 0.5 a_5 \cos(\theta_
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0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) - 0.5 a_3 \ln_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(\theta_5) \cos(2.0 \theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
0.5 a_2 lc_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5)
0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \lg_2 \lg_5 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)
0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_2 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_2 2 m_5 \dot{\theta}_3 \cos(2.0 \theta_2) \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_
0.5 a_2 \ln_2 a_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_3 \ln_2 a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln_2 a_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \ln_2 a_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(\theta_5) \sin(\theta_5
0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_3 \log_{12} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \sin(2.0 \theta_5
0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_3 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.25 a_5 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta
0.25 a_5 \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.25 a_2 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) +
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_5)} \,
0.25 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 \log_{5.2}^{2} \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) + 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) + 0.5 \log_{1.1} \log_{1.1} \log_{1.1} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_2)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)}^2 \cos{(
1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_2) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^
1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2
1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(
1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) 
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, 
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
0.5 \log_{5,2} \log_{5,3} m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \log_{5,2} \log_{5,3} m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \log_{5,2} \log_{5,3} m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \log_{5,2} \log_{5,3} m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \log_{5,2} \log_{5,3} m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \log_{5,2} \log_{5,3} m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \log_{5,2} \log_{5,3} m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \log_{5,2} \log_{5,2}
0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 \lg_{5.2} \lg_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 a_4 \lg_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
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0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} 
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5,2}{}^2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5,2}{}^2 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 \log_{10} \log_{
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 1.0 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) \sin(
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
1.0 I_{xx.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 I_{xx.5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
1.0 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \sin(\theta_4) - 1.0 I_{\text{vv},6} \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta
1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(
1.0 I_{\text{VV}} = 5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.25 a_4 a_5 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos\left(\theta_2\right) \, \cos\left(\theta_3\right) \, \cos\left(\theta_4\right) \, \cos\left(\theta_5\right) - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos\left(\theta_2\right) \, \cos\left(\theta_3\right)^2 \, \cos\left(\theta_4\right)^2 \, \cos\left(\theta_5\right)^2 \, \sin\left(\theta_2\right) - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos\left(\theta_4\right)^2 \, \cos\left(\theta_3\right) \, \cos\left(\theta_4\right)^2 \, \cos\left(\theta_5\right) - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos\left(\theta_5\right)^2 \, \sin\left(\theta_5\right) - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos\left(\theta_5\right)^2 \, \sin\left(\theta_5\right) - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos\left(\theta_5\right) + 0.5 \, a_5^2 
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5
1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) +
1.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.5 a_4 \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3)
0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(\theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) + 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(2.0 \theta_3) \sin(\theta_5) - 0.5 a_4 \log_{10} \theta_1 \cos(2.0 \theta_3) \sin(2.0 \theta_3) \cos(2.0 \theta_3)
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 a_2 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{2}) - 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \sin (\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{3} \sin (\theta_{5}
2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{2})} - 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})}^{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})}^{2} \cos{(\theta_{5})}^{2} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_
2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5})^{2} \sin (\theta_{3}) - 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{5}) \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{5}) \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2})^{2} \cos (\theta_{3})^{2} \cos (\theta_{5}) \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5})^{2} \sin (\theta_{5}) + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \sin (\theta_{5}) + 
2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) +
0.5 \, a_4 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(\theta_5) - 0.5 \, a_5 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_2 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2) - 0.5 \, a_5 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2) - 0.5 \, a_5 \, \text{lc}_5 \, 2 \, m_5 \, \dot{\theta}_3 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2) \, \sin(2.0 \, \theta_5) \, \cos(\theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \cos(
1.0 \, a_1 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_
1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_5
0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 0.5 a_1 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) 
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \,
1.0 \log_{11} \log_{12} \log_{13} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_4 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + 0.5 a_4 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) - 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 0.5 \log_{12} m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \cos
0.5 \, a_4 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_1 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 1.0 \, a_1 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_2 \, \mathrm{lc}_{5\,2} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(
1.0 \, a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta
1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)
0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}
0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_4 \log_4 \theta_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + 1.0 \log_4 \log_4 \theta_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) - 1.0 \log_4 \log_4 \theta_2 \cos(\theta_4) \sin(\theta_5) + 1.0 \log_4 \log_4 \theta_3 \cos(\theta_4) \sin(\theta_5) + 1.0 \log_4 \log_4 \theta_4 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_4 \log_4 \theta_4 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_4 \log_4 \theta_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_4 \log_4 \theta_5 \cos(\theta_5) \cos(\theta_5)
1.0 \log_{4,1} \log_{4,2} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_4) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 1.0 \log_{5,1} \log_{5,1
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1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5,2} \log_{5,2} m
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) 
1.0 \, a_1 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)}
0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} 
0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.3} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.3} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.3} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.3} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.3} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \mathrm
1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 a_5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 +
0.25 a_3 \ln a_5 \ln a_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_4 \ln a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 1.0 a_4 \ln a_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) + 1.0 a_4 \ln a_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0
1.0 \, a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} + 0.5 \, a_5 \, 
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_4) \, \sin(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_5) - 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \cos(\theta_2)^2 - 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_5) \, \cos(2.0 \, \theta_5) \, \cos(\theta_5)^2 - 0.5 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_5) \, \cos(2.0 \, \theta
1.0 \log_2 \log_3 m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5 \log_1 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 -
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
0.25 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} 
0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, \cos{(\theta_5
1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_5) - 0.125 \, a_5 \, a
0.25 a_5 \log_{10} a_5 
0.25 a_5 \log_{10} a_5 \log_{10} a_5 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 a_4 \log_{10} a_5 \log(2.0 \theta_5) \sin(2.0 \theta_5) \sin(
0.25 \, a_4 \, \mathrm{lc}_4 \, 2 \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, d_5 \, d_5
0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_5 \, d_5 \, 
1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_5) + 1.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_5) + 1.0 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \,
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.1} \log_{1.1} \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_{1.1} \cos(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \log_{1.1} \log_
0.5 \, \text{lc}_{5 \, 1} \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)}^2 + 0.5 \, \text{lc}_{4.1} \, \text{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{4.1} \, \text{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{4.1} \, \text{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} + 0.5 \, \text{lc}_{4.1} \, \text{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4.1} \, \text{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.5 \, \text{lc}_{4.1} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, 
0.5 \operatorname{lc}_{41} \operatorname{lc}_{42} m_4 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 a_5 \operatorname{lc}_{51} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 +
0.25 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)}
1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 -
4.0 \log_{10} \log_{
0.25 \, a_4^2 \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_4) \, \cos(\theta_4) \, \sin(\theta_4) \, d\phi_4 \, d
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
0.25 a_5 \lg_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 a_5 \lg_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 a_5 \lg_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \sin{
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) - 1.0 \log_{10} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_2) - 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
1.0 \log_{4.2}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1}^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
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1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4
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1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
1.0 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 1.0 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 1.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
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2.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_4) \cos(\theta_5) \cos
2.0 \log_{10} \log_{
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5.2} m_5 \dot{\theta}_5 
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_5) + 2.0 \log_{1.1} \log_{1.
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3)^2 \cos(\theta_3)^2 \cos(
4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
1.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, d\phi_3 \, d\phi_4 \, d\phi_4 \, d\phi_4 \, d\phi_5 \, d\phi_6 \, d\phi_6
1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)}
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0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4)^2 \cos (\theta_5) \sin (\theta_2) \sin (\theta_3) \sin (\theta_5) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4) \cos (\theta_5) \sin (\theta_4) \sin (\theta_5) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5) \sin (\theta_4) \sin (\theta_5) + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) + 0.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) + 0.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) + 0.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) + 0.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) \sin (\theta_4) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3) \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_3) \sin (\theta_4) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_3) \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2) \cos (\theta_3)^2 \cos (\theta_4) \cos (\theta_5)^2 \sin (\theta_3) \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3) \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3) \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4) \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) + 0.0 \, a_5^2 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_2) \sin (\theta_3) + 0.0 \, a_5^2 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4)^2 \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4)^2 \sin (\theta_5) + 0.0 \, a_5^2 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4)^2 \sin (\theta_5)^2 \, a_5^2 \, a_5^2 \, a_5^2 \, \dot{\theta}_1 \cos (\theta_2)^2 \cos (\theta_3)^2 \cos (\theta_4)^2 \cos (\theta_5)^2 \sin (\theta_4)^2 \, a_5^2 \,
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C_{42} = 1.0 I_{\text{xy},4} \dot{\theta}_2 + 1.0 I_{\text{xy},5} \dot{\theta}_2 - 2.0 I_{\text{xy},4} \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 I_{\text{xy},4} \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_3 \cos(\theta_3)^2 - 2.0 I_{\text{xy},
2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5)^2 - 0.5 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) + 0.5 I_{vv,4} \dot{\theta}_1 \cos(\theta_2) + 0.5 I_{vv,5} \dot{\theta}_1 \cos(\theta_2) - 0.5 I_{vv,5} \dot{\theta}_2 \cos(\theta_3)^2 + 0.5 I_{vv,5} \dot{\theta}_3 \cos(\theta_3)^2 + 0.5 I_
0.5 I_{zz,4} \dot{\theta}_1 \cos(\theta_2) - 0.5 I_{zz,5} \dot{\theta}_1 \cos(\theta_2) - 0.5 a_4 \lg_{4,2} m_4 \dot{\theta}_2 - 0.5 a_5 \lg_{5,2} m_5 \dot{\theta}_2 - 1.0 \lg_{4,1} \lg_{4,2} m_4 \dot{\theta}_2 - 1.0 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 + 1.0 \lg_{4,1} \lg_{4,2} m_4 \dot{\theta}_2 - 1.0 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 + 1.0 \lg_{4,1} \lg_{4,2} m_4 \dot{\theta}_2 - 1.0 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 + 1.0 \lg_{4,1} \lg_{4,2} m_4 \dot{\theta}_2 - 1.0 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 + 1.0 \lg_{5,1} l_5 \dot{\theta}_2 + 1.0 \lg_{5,1} l_5 \dot{\theta}_2 + 1.0 \lg_{5,1} l_5 \dot{\theta}_3 + 1.0 l_5 \dot{\theta}_3 + 1.0 l_5 \dot{
1.0 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 + 1.0 I_{xx,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 + 1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 + 1.0
1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 - 1.0 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3)^2 - 1.0 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3)^2 - 1.0 I_{\text{vv},6}
1.0\,I_{yy,5}\,\dot{\theta}_{1}\,\cos{(\theta_{2})}\,\cos{(\theta_{4})}^{2}-1.0\,I_{yy,5}\,\dot{\theta}_{1}\,\cos{(\theta_{2})}\,\cos{(\theta_{5})}^{2}+4.0\,I_{xy,4}\,\dot{\theta}_{2}\cos{(\theta_{3})}^{2}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{2}\cos{(\theta_{3})}^{2}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{2}\cos{(\theta_{3})}^{2}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2}+4.0\,I_{xy,5}\,\dot{\theta}_{3}\cos{(\theta_{4})}^{2
4.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 1.0 I_{xx,4} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xx,5} 
1.0 I_{xx,4} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{yy,4} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 I_{yy,4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) - 1.0 I_{yy,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{yy,4} \dot{\theta}_5 \cos(\theta_5) + 1.0 I_{yy,4} \dot{\theta}_5 
1.0\,I_{\text{yy},5}\,\dot{\theta}_2\,\cos{(\theta_3)}\,\sin{(\theta_3)} + 1.0\,I_{\text{yy},4}\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} + 1.0\,I_{\text{yy},5}\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} + 1.0\,I_{\text{yv},5}\,\dot{\theta}_2\,\cos{(\theta_5)}\,\sin{(\theta_5)} - 1.0\,I_{\text{yy},5}\,\dot{\theta}_2\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 1.0\,I_{\text{yy},5}\,\dot{\theta}_3\,
1.0 \log_{4,2}{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)} - 1.0 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_2)} - 0.25 a_4{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}{^2} - 0.25 a_4{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}{^2} - 0.25 a_4{^2} m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(
1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 - 1.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \, \cos{(\theta_3)}^2 - 0.25 \, a_5^2 \, \dot{\theta}_3 \, \dot{\theta}_3 \, \dot{\theta}_3 \,
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 + 2.0 I_{xx,4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx,4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \dot{\theta}_4 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx,4} \dot{\theta}_5 \cos(\theta_4) + 2.0 I_{xx,4} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xx,4} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xx,4} \dot{\theta
2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3
2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5
2.0 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},4} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},6} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{\text{vv},6} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_3) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 1.0 \log_{4.1}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} -
1.0 \log_{4.1}{}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 + 1.0 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 + 1.0 \log_{4.2}{}^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 - 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 + 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_
1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 - 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 + 1.0 \log_{5.2}{}^2 m_5 \dot
1.0 \log_{2} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{5})^{2} + 1.0 a_{4} \log_{4} 2 m_{4} \dot{\theta}_{2} \cos(\theta_{3})^{2} + 1.0 a_{4} \log_{4} 2 m_{4} \dot{\theta}_{2} \cos(\theta_{4})^{2} + 1.0 a_{5} \log_{5} 2 m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} + 1.0 \log_{5} 2 m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} + 1.0 \log_{5} 2 m_{5} \dot{\theta}_{3} \cos(\theta_{3})^{2}
1.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 1.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 \log_4 \log_4 \theta_2 \cos(\theta_3)^2 + 2.0 \log_4 \log_4 \theta_2 \cos(\theta_4)^2 + 1.0 \log_4 \theta_4 \cos
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 2.0 I_{\text{XX},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 2.0 I_{\text{XX},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5)^2 + 2.0 I_{xx,5
2.0 I_{\text{vv},4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos
2.0 \, I_{\text{vv.}5} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)^2} \, \cos{(\theta_5)^2} - 2.0 \, I_{\text{xv.}4} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 2.0 \, I_{\text{xy.}5} \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_
2.0 I_{xy,4} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_5 \cos(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_5 \cos
1.0 I_{yz,4} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 0.25 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.25 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_4^2 m_4 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 0.25 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_4) \cos(\theta_4) + 0.25 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_4) + 0.25 a_4^2 m_4 \dot{\theta}_4 \cos(\theta_4) + 0.
0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 
8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_3) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_3) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 1.0 I_{xz,4} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) \sin(\theta
1.0 \log_{4.1}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} - 1.0 \log_{4.2}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} + 1.0 \log_{4.1}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \log_{4.2}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 1.0 \log_{4.2}{}^2 m_4 \dot{\theta
1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} - 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} + 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_4)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} + 1.0 \log_{5.2}{
1.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 I_{vz,4} \dot{\theta}_{1} \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) - 0.5 a_{4} a_{5} m_{5} \dot{\theta}_{2} \cos(\theta_{5}) + 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) + 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) + 1.0 \log_{5.2}^{2} 
1.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.0 \, a_4 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} + 1.
1.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \sin(\theta_5) - 2.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 1.0 lc_{4,1}^2 m_5 \dot{\theta}_2 \sin(\theta_5) - 2.0 lc_{4,1}^2 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 1.0 lc_{4,1}^2 m_5 \dot{\theta}_2 \sin(\theta_5) - 2.0 lc_{4,1}^2 m_5 \dot{\theta}_2 \sin(\theta_5) - 2.0 lc_{4,1}^2 m_5 \dot{\theta}_2 \sin(\theta_5) - 2.0 lc_{4,1}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \cos(\theta
2.0 \log_{4.2}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \log_{4.2}{}^2 m_4 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{5.1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 2.0 \log_{10}{}^2 \sin{(\theta_3)} + 2.0 \log_{10}{}^2 \sin{(\theta_3)} + 2.0 \log_{10}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{10}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} - 2.0 \log_{10}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} + 2.0 \log_{10}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \cos{(\theta_5)}
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2.0 \log_{5.1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 2.0 \log_{5.1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \log_{5.1}{}^2 \sin{(\theta_3)} + 2.0 \log_{5.1}{}^2 \sin{(\theta_3)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5.1}{}^2 \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_5)} \cos{(\theta_4)} \cos{(\theta_5)} 
2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \log_{5,2}{}^2 \sin{(\theta_4)} + 2.0 \log_{5,2}{}^2 \sin{(\theta_4)} + 2.0 \log_{5,2}{}^2 \sin{(\theta_4)} + 2.0 \log_{5,2}{}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \log_{5,2}{}^2 \cos{(\theta_5)} \cos{(\theta_5)
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} - 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{4})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{2} \sin{
1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 - 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 - 1.0 \, a_3 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_4)} \cos{(\theta_4)} + 1.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \cos{(\theta_4)} \cos
1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 - 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 +
2.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)} - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \sin{(\theta_4)} - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \sin{(\theta_4)} - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \sin{(\theta_4)} - 1.0 \, a_3 \, a_4 \, a_5 \, \dot{\theta}_3 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \sin{(\theta_4)} - 1.0 \, a_5 \, a
1.0\,a_3\,\mathrm{lc}_{4,1}\,m_4\,\dot{\theta}_2\cos{(\theta_3)}^2\sin{(\theta_4)} - 2.0\,a_4\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\cos{(\theta_3)}^2\sin{(\theta_5)} - 2.0\,a_4\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_2\cos{(\theta_4)}^2\sin{(\theta_5)} + 0.5\,a_4^2\,m_4\,\dot{\theta}_1\,\cos{(\theta_2)}\cos{(\theta_3)}^2\cos{(\theta_4)}^2 + 0.0\,a_4^2\,a_5^2\cos{(\theta_3)}^2\sin{(\theta_5)} - 0.0\,a_4^2\,a_5^2\cos{(\theta_3)}^2\sin{(\theta_5)} + 0.0\,a_4^2\,a_5^2\cos{(\theta_3)}^2\sin{(\theta_5)} + 0.0\,a_4^2\,a_5^2\cos{(\theta_3)}^2\sin{(\theta_5)} + 0.0\,a_4^2\,a_5^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2\cos{(\theta_3)}^2
2.0 \, a_4^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta
4.0 I_{xx,5} \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 I_{yy,5} \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 I_{yy,5} \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 4.0 I_{yy,5} \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 I_{yy,5} \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 
4.0 I_{\text{vv},5} \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 I_{\text{c}_{4,1}}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} - 2.0 I_{\text{c}_{4,2}}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} + 2.0 I_{\text{c}_{4,2}}^2 \sin{(\theta_5)} \sin{(\theta_5)} + 2.0 I_{\text{c}_{4,1}}^2 m_4 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)^2} - 2.0 I_{\text{c}_{4,2}}^2 \sin{(\theta_5)} \cos{(\theta_4)^2} + 2.0 I_{\text{c}_{4,1}}^2 \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 I_{\text{c}_{4,1}}^2 \sin{(\theta_5)} \cos{(\theta_4)} \cos{(\theta_5)} \cos{(\theta_4)} \cos{(\theta_5)} \cos{
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})}^{2} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})}^{2} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} 
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})^{2}} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} - 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{5})^{2}} + 2.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})^{2}} \cos{(\theta_{
2.0 \, a_4 \, \mathrm{lc}_{42} \, m_4 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \, a_5 \, \mathrm{lc}_{52} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 2.0 \, a_5 \, \mathrm{lc}_{52} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 -
2.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 \log_4 \log_4 \theta_2 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 \log_4 \log_5 \theta_2 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 \log_4 \theta_2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 I_{xz,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 I_{xz,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 I_{xz,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 I_{xz,5} \dot{\theta}_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xy,4} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 - 4.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5)^2 - 4.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5)^2 
4.0\,I_{\text{xv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_4\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right)\,\cos\left(\theta_5\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_5\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_2\,\cos\left(\theta_4\right)\,\cos\left(\theta_5\right)\,\sin\left(\theta_4\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_2\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_2\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_2\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_3\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_5\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_5\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 4.0\,I_{\text{xv},5}\,\dot{\theta}_
1.0 I_{yz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 I_{yz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 I_{yz,5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 1.0 I_{yz,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5
1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta
0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) - 0.5 \, a_2 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) - 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) - 1.0 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) + 1.0 \, a_4 \, a_5 \, \dot{\theta}_4 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_3) \, \cos(\theta_4) + 1.0 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \cos(\theta_5) + 1.0 \, I_{\text{Vz},5} \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 1.0 \, a_3 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) - 1.0 \, a_3 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, d_4 \, d_5 
1.0 a_2 lc_{4,1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) + 1.0 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 1.0 a_3 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_4) + 1.0 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) + 1.0 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 1.0 a_3 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_4) + 1.0 a_2 lc_{4,2} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) + 1.0 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 1.0 a_3 lc_{5,2} m_4 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) + 1.0 a_3 lc_{5,3} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 1.0 a_3 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 a_3 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) + 1.0 a_3 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 a_3 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) + 1.0 a_3 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) + 1.0 a_3 lc_{5,3} m_5 \dot{\theta}_3 \cos(\theta_5) + 1.0 a_5 lc_{5,3} m
1.0 \, a_2 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 1.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, d^{-1} \, d^{-1} \,
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, I_{\mathrm{xv},4} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 4.0 \, I_{\mathrm{xv},4} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, I_{\mathrm{xv},4} \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, I_{\mathrm{xv},4} \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, I_{\mathrm{xv},4} \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, I_{\mathrm{xv},4} \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos
4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 
4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_3 \cos(\theta_5) 
0.5 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_4 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_4^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_3
2.0 \, a_4^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^
0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta
0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 1.0 a_3 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_4) - 2.0 a_4 \ln_{4.1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 a_5 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_4) - 2.0 a_4 \ln_{4.1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 a_5 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_4) - 2.0 a_4 \ln_{4.1} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 a_5 \ln_{4.2} m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_4) - 2.0 a_5 \ln_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_4) - 2.0 a_5 \ln_{4.2} m_4 \dot{\theta}_3 \cos(\theta_3) \cos
2.0 \, a_4 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \sin \left(\theta_4\right) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_2\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_2\right) \cos \left(\theta_4\right)^2 \sin \left(\theta_5\right) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \sin \left(\theta_5\right) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \sin \left(\theta_5\right) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \sin \left(\theta_5\right) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \sin \left(\theta_5\right) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \sin \left(\theta_5\right) + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) \cos \left(\theta
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2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_4) - 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) + 1.
2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{
1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \sin \left(\theta_4\right) \sin \left(\theta_5\right) - 8.0 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos \left(\theta_2\right) \cos \left(\theta_3\right) \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right)^2 \sin \left(\theta_3\right) - 8.0 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos \left(\theta_2\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_4\right) - 8.0 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos \left(\theta_3\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_4\right) + 8.0 \, I_{\mathrm{xv},5} \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \sin \left(\theta_4\right) \sin \left(\theta_5\right) - 8.0 \, I_{\mathrm{xv},5} \, \dot{\theta}_3 \cos \left(\theta_4\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_4\right) \sin \left(\theta_5\right) - 8.0 \, I_{\mathrm{xv},5} \, \dot{\theta}_4 \cos \left(\theta_5\right) \cos \left(\theta_5\right)^2 \sin \left(\theta_5\right) + 8.0 \, I_{\mathrm{xv},5} \, \dot{\theta}_5 \cos \left(\theta_5\right) 
8.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 
1.0 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 4.0 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 lc_{5,1}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 lc_{5,1}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos
4.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 4.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 4.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 4.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 4.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 4.0 \log_{5,2}{}^2 \cos{(\theta_5)} \cos{(
4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_4 a_5 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) + 2.0 a_4 \log_{4.1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 \log_{4.1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{4.1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_
2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 - 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)}^2 + 2.0 \, a_5 \, \lg_{5,1} \, m_5 \, \dot{\theta}_3 \, d_5 \, \dot{\theta}_3 \, d_5 
4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_5)} + 2.0 \, I_{\mathrm{xx},4} \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_5)} + 2.0 \, I_{\mathrm{xx},4} \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_5)} + 2.0 \, I_{\mathrm{xx},4} \, \dot{\theta}_1 \, \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_3)} \sin{(\theta_4)} + 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_5)} + 2.0 \, I_{\mathrm{xx},4} \, \dot{\theta}_1 \, \cos{(\theta_5)} \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} + 2.0 \, \mathrm{
2.0\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_4\right) + 2.0\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_5\right) + 2.0\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) + 2.0\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) + 2.0\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) + 2.0\,I_{\text{xx}
2.0\,I_{\text{vv},4}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_4\right) - 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_4\right) - 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_3\,\cos\left(\theta_3\right) + 2.0\,I_{\text{vv},5}\,\dot{\theta}_3\,\cos\left(\theta_
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 l_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 l_{5,1}^2 \cos(\theta_5)^2 \cos(\theta_5)^2 + 4.0 l_{5,1}^2 \cos(\theta_5)^2 
4.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} - 1.0 a_{2} \log_{4,2} m_{4} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})} + 1.0 a_{3} \log_{5,2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{4})} \cos{(\theta_{5})} + 1.0 a_{4} \log_{4,2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} + 1.0 a_{5} \log_{4,2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{
1.0 a_2 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_4) - 0.5 a_2 a_4 m_4 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos
1.0 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) - 1.0 \, a_2 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_3 \, a_4 \, a_4 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_4 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_3) - 0.5 \, a_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_4) \, \dot{\theta}_3 
1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) + 0.5 \, a_3 \, a_5 \, a
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.5 \, a_4 \, a_5 
1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 1.0 a_2 lc_{4,1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) + 1.0 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 1.0 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 1.0 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 1.0 a_4 lc_{4,2} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 1.0 a_4 lc_{4,2} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 a_4 lc_{4,2} m_4 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \cos
1.0 \, a_3 \, \mathrm{lc}_{4,1} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \dot{\theta}_2 \, \cos(\theta_5) \, \dot{\theta}_3 \, \dot{\theta}_4 \, \cos(\theta_5) \, \dot{\theta}_5 \, \dot{\theta}_5
1.0 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) 
1.0 a_2 \ln t_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 1.0 a_2 \ln t_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) - 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_4) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_4) + 1.0 a_5 \ln t_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)}
1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_5) - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_4) \, \sin(\theta_5) + 2.0 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_5) + 2.0 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_5) + 2.0 \, \mathrm{lc}_{4.1} \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_3) \, \sin(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_4) \, \cos(\theta_5) \, \cos
2.0 \, \text{lc}_{4.1} \, \text{lc}_{4.2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, \text{lc}_{4.2} \, \text{lc}_{4.3} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} + 2.0 \, \text{lc}_{5.1} \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 2.0 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \,
2.0 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 + 4.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 + 4.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 + 4.0 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta
1.0 a_2 \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 a_3 \log_{4.2} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_4) + 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_4) + 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_3 \cos(\theta_4) + 0.5 a_4 \log_{4.3} m_4 \dot{\theta}_4 \cos(\theta_4) + 0.5 a_
0.5 a_4 \ln a_4 \ln a_4 + \ln a_5 \ln a_4 \ln a_5 
1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) - 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_5) - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_5) - 1.0 \, a_4 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_5) - 1.0 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_4) \, \sin(\theta_5) - 1.0 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_4) \, \sin(\theta_5) \, d\phi_5 \, d\phi_6 \, d\phi_
1.0 a_2 \ln c_5 a_2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 2.0 a_4 \ln c_5 a_2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_5) - 2.0 a_4 \ln c_5 a_2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) - 2.0 a_4 \ln c_5 a_2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) - 2.0 a_4 \ln c_5 a_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 2.0 a_4 \ln c_5 a_5 a_5 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 \ln c_5 a_5 \cos(\theta_5) \cos(\theta_5)
0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 8.0 \log_{10} \log_{10} (\theta_5) + 8.0 \log_{10} (\theta_5) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(
1.0 \log_{4,1} \log_{4,2} \sin(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 \log_{2} \log_{5,1} m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{4,2} \log_{4,3} m_4 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{4,2} \log_{4,2} \log_{4,3} m_4 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{4,2} \log_{4,
8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5
8.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 a_4 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) + 1.0 a_3 a_4 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) - 0.0 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.0 \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) + 0.0 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.0 \cos(\theta_5) \cos(\theta_5
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) - 1.0 \, a_3 \, \mathrm{lc}_{4.1} \, m_4 \, \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_
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1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right) + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_5 
    1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)^2} \, \sin{(\theta_5)} - 4.0 \, a_4 \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \cos{(\theta_4)^2} \, \cos{(\theta_5)} - 2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)^2} \, \cos{(\theta_4)^2} \, \sin{(\theta_5)} - \frac{1}{2} \, \sin{(\theta_5)} + \frac{1}{2} \, \cos{(\theta_5)} + \frac{1}{2} \, \sin{(\theta_5)} + 
    4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \sin{(\theta_4)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5
    4.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_4^2 m_4 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
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    0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta
    4.0 I_{\text{xx},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
    0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 2.0 \, \mathrm{lc}_{4,1}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, \mathrm{lc}_{4,2}^2 \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{
2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
    2.0 \log_{1.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{1.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 2.0 \log_{1.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{1.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{1.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{1.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{1.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
    1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, 
    1.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_2 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_2 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) + 1.0 \, a_3 \, \mathrm{lc}_{4\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos
    1.0 \, a_2 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) + 2.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 2.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 2.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 2.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) 
    1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5)
    1.0 \, a_3 \, a_4 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_4) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) \, \cos(\theta_3) \, \cos(\theta_
    1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 4.0 a_5 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 1.0 a_3 \log_{4.1} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{5.1} \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
    2.0 \, a_4 \, \mathrm{lc}_{4.2} \, m_4 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5
    1.0 \, a_2 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_{5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_{5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_{5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_{5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_{5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_{5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_{5} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
    1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
    2.0 \, a_5 \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_5) + 2.0 \, a_5 \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, \text{lc}_{4 \, 1} \, \text{lc}_{4 \, 2} \, m_4 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 4.0 \, \text{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, \text{lc}_{4 \, 1} \, m_4 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_4) \, \sin(\theta_5) \, d_5 \, d
    4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_2)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, 
    1.0 \log_2 \log_3 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 4.0 \log_1 \log_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 \log_1 \log_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 \log_1 \log_2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_1 \log_2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_1 \log_2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_2 \log_2 \cos(\theta_5) \cos(\theta_5
    1.0 a_2 \ln c_5 a_5 = m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_3 \ln c_5 a_5 = m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \ln c_5 a_5 = m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta
    0.5\,a_5\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_1\,\cos{(\theta_4)}\,\sin{(\theta_2)}\,\sin{(\theta_3)}\,\sin{(\theta_5)} + 0.5\,a_5\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_1\,\cos{(\theta_5)}\,\sin{(\theta_2)}\,\sin{(\theta_3)}\,\sin{(\theta_4)} + 1.0\,\mathrm{lc}_{5.1}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_1\,\cos{(\theta_3)}\,\sin{(\theta_2)}\,\sin{(\theta_4)} + 1.0\,\mathrm{lc}_{5.1}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_1\,\cos{(\theta_3)}\,\sin{(\theta_4)} + 1.0\,\mathrm{lc}_{5.1}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_1\,\cos{(\theta_4)}\,\sin{(\theta_4)}\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.1}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_1\,\cos{(\theta_4)}\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_2\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_2\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_2\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,\mathrm{lc}_{5.3}\,m_5\,\dot{\theta}_2\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_2\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_2\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_2\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_3\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,\sin{(\theta_5)} + 1.0\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot{\theta}_3\,m_5\,\dot
    1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(
    4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(
    4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5
    4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \text{lc}_{5,3} m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \sin(\theta_4) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
    1.0 \, a_3 \, \log_2 m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \sin(\theta_5) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_4) + 0.5 \, \sin(\theta_4) + 0.5 \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_5 \, \dot{\theta
    2.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 2.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, 
    1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} 
    2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 4.0 a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
    2.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_
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2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \sin(\theta_3) \, \sin(\theta_5) + 2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \cos(\theta_3)^2 \, \cos(\theta_4) \, \sin(\theta_4) \, \sin(\theta_5) - 4.0 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \sin(\theta_3) - 4.0 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \sin(\theta_3) - 4.0 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \sin(\theta_3) + 2.0 \, \mathrm{lc}_{4,1} \, \mathrm{lc}_{4,2} \, \mathrm{lc}_{4,2} \, \mathrm{lc}_{4,3} \, \mathrm{lc}_{4,4} \,
4.0 \log_{4.1} \log_{4.2} m_4 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \sin(\theta_3) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_3) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_3) - 4.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3)^2 \sin(\theta_3) - 4.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos(
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 4.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 4.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) -
4.0 \log_{10} \log_{
4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^
4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(
8.0 \log_{10} \log_{
8.0 \log_{5} \log_{1} \log_{1} \log_{2} (\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) + 8.0 I_{xv,5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{5}) - 9.0 \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_{5})
4.0 \log_{5.1}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos
2.0 \, a_4 \, \mathrm{lc}_{4\,1} \, m_4 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, d\phi_2
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \,
2.0 a_5 lc_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 a_4 lc_{5.1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
2.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
1.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(
1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 1.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
4.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{3})} \cos{(\theta_{5})} \sin{(\theta_{3})} \sin{(\theta_{5})} - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} \sin{(\theta_{4})} + 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})} \cos{(\theta_{5})}^{2} \sin{(\theta_{3})} \sin{(\theta_{4})} + 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})} \cos{(\theta_{5})} \sin{(\theta_{3})} \sin{(\theta_{4})} + 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} \cos{(\theta_{5})} \cos{(
4.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})}^{2} \cos{(\theta_{4})} \cos{(\theta_{5})} \sin{(\theta_{4})} \sin{(\theta_{5})} - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{3})} \sin{(\theta_{5})} - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{3})} \cos{(\theta_{5})} \sin{(\theta_{5})} - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{5})} \cos{(\theta_{5})} \sin{(\theta_{5})} + 4.0 \log_{5.2}^{2} m_{
4.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 2.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) \, d\phi_2
4.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
4.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(
4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 4.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(
8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 8.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 8.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 8.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
8.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 a_4 \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
2.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) - 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 4.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5
4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \,
4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d
4.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8.0 \log_{11} \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5)
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(A44)

 $C_{43} = a_3 \, \text{lc}_{4,2} \, m_4 \, \dot{\theta}_3 \, \cos \left(\theta_4\right) - \frac{a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos \left(\theta_5\right)}{2} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos \left(\theta_5\right) + 0.5 \, a_3 \, a_4 \, m_4 \, \dot{\theta}_3 \, \sin \left(\theta_4\right) + a_3 \, a_4 \, m_5 \, \dot{\theta}_3 \, \sin \left(\theta_4\right) + a_3 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_3 \, \sin \left(\theta_4\right) + a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin \left(\theta_5\right) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos \left(\theta_4\right) \, \cos \left(\theta_5\right) + a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos \left(\theta_4\right) \, \cos \left(\theta_5\right) - 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos \left(\theta_4\right) \, \sin \left(\theta_2\right) - 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos \left(\theta_4\right) \, \sin \left(\theta_5\right) - 1.0 \, a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \, \sin \left(\theta_4\right) - \frac{a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin \left(\theta_4\right) \, \sin \left(\theta_5\right)}{2} - 1.0 \, a_3 \, \text{lc}_{4,1} \, m_4 \, \dot{\theta}_1 \, \sin \left(\theta_2\right) \, \sin \left(\theta_4\right) - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin \left(\theta_4\right) \, \sin \left(\theta_5\right) - \frac{a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \, \cos \left(\theta_5\right) \, \sin \left(\theta_2\right) \, \sin \left(\theta_4\right) \, \sin \left(\theta_5\right)}{2} - 1.0 \, a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \, \cos \left(\theta_5\right) \, \sin \left(\theta_2\right) \, \sin \left(\theta_5\right) + a_3 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \, \sin \left(\theta_5\right) + a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin \left(\theta_5\right) \, \sin \left(\theta_5\right) + a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos \left(\theta_4\right) \, \sin \left(\theta_5\right) + a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin \left(\theta_5\right) \, \sin \left(\theta_5\right) + a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin \left(\theta_5\right) \, \sin \left(\theta_5\right) + a_3 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin \left(\theta_5\right) \, \sin \left(\theta_$

$$C_{44} = 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin(\theta_5) - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) - \frac{a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5)}{2}$$
(A46)

 $C_{45} = 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 1.0 \, a_4 \, \text{lc}_{5,1} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} - 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \text{lc}_{5,2}$

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C_{51} = -0.25 I_{xy.5} \dot{\theta}_1 - 0.5 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 + 0.5 I_{xy.5} \dot{\theta}_1 \cos(\theta_3)^2 + 0.5 I_{xy.5} \dot{\theta}_1 \cos(\theta_4)^2 + 0.5 I_{xy.5} \dot{\theta}_1 \cos(\theta_5)^2 - 0.5 I_{xy.5} \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 I_{xy.5} \dot{\theta}_1 \cos(\theta_5)^
0.5 I_{zz,5} \dot{\theta}_2 \cos(\theta_2) + 0.125 a_5 lc_{5,2} m_5 \dot{\theta}_1 + 0.25 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_1 + 1.0 I_{xv,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + 1.0 I_{xv,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 + 1.0 I_{xv,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 + 1.0 I_{xv,5} \dot{\theta}_1 \cos(\theta_3)^2 + 1.0 I_{xv,5} \dot{\theta}_2 \cos(\theta_3)^2 + 1.0 I_{xv,5} \dot{\theta}_1 \cos(\theta_3)^2 + 1.0 I_{xv,5} \dot{\theta}_2 \cos(\theta_3)^2 + 1.0 I_{xv,5} \dot{\theta}_3 \cos(\theta
1.0\,I_{\text{xv}.5}\,\dot{\theta}_{1}\cos{(\theta_{2})^{2}}\cos{(\theta_{5})^{2}}-1.0\,I_{\text{xv}.5}\,\dot{\theta}_{1}\cos{(\theta_{3})^{2}}\cos{(\theta_{4})^{2}}-1.0\,I_{\text{xv}.5}\,\dot{\theta}_{1}\cos{(\theta_{3})^{2}}\cos{(\theta_{5})^{2}}-1.0\,I_{\text{xv}.5}\,\dot{\theta}_{1}\cos{(\theta_{4})^{2}}\cos{(\theta_{5})^{2}}-1.0\,I_{\text{xv}.5}\,\dot{\theta}_{1}\cos{(\theta_{5})^{2}}
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_2) - 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_4) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) + 0.25 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) + 0
0.25 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_4) - 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.25 I_{yy,5} \dot{\theta}_3 \cos(\theta_5) + 0.25 
0.25 I_{\text{yy},5} \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos{(\theta_2)} - 0.5 \log_{10}^{2} m_5 \dot{\theta}_2 \cos{(\theta_2)} + 0.5 I_{\text{xx},5} \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_2)} + 0.5 I_{\text{xx},5} \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_2)} + 0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(\theta_2)} \cos{(\theta_2)} + 0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(\theta_2)} \cos
0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) + 0.5 I_{xx,5} \dot{\theta}_3 \cos(\theta_3) + 0.5 I_{xx,5} \dot{
0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 0.5 I_{xx.5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^
0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx} = \dot{\theta}_1 \cos(\theta_5) - 0.5 I
0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{xx,5} \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3) - 0.5 I_{yy,5} \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3)^2 \sin(\theta_3)^
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) + 0.5 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) + 0.5
0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.5 I_{\text{vv.}5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) 
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) - 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) + 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) + 0.5 I_{\text{vv},
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 I_{\text{vv},5} \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} - 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} - 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 a_5 \ln_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 - 0.5 \log_1 \log_2 \theta_1 \cos(\theta_3)^2 - 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_1 \cos(\theta_4)^2 + 0.5 \log_2 \theta_2 \cos(\theta_4)^2 + 0.5 \log_2 \theta_4 \cos(\theta_4)^2 + 0.5 \log_2 \theta_4 \cos(\theta_4)^2 + 0.5 
0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4)^2 - 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 0.25 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) -
0.125\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_5)} - 0.125\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_4)} - 0.125\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.125\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.125\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.125\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)}\,\sin{(2.0\,\theta_5)} + 0.125\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos{(2.0\,\theta_5)} + 0.125\,I_{\text
0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_4)} + 0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.125 I_{\text{yy},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin
0.25 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.25 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} + 0.25 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} + 0.25 I_{xy,5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(
0.125 I_{xx,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.125 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \sin(\theta_2) - 0.000 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.000 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 0.000 \sin(\theta_5) 
0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} - 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, I_{\text{xv},5} \, \dot{\theta}_3 \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d^2 \cos{(\theta_5)} \, \sin{(\theta_5)} \, d^2 \cos{(\theta_5)} \, d^2 \cos{
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^
0.25 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)} \cos{(\theta_3)} \cos{(\theta_3)} \sin{(\theta_3)} + 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_3)} 
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \sin{(\theta_4)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.25 \log_{5,2}{}^2 m_
0.375 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.75 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.75 \, a_4 \, \mathrm{lc}_{5\,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} - 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 0.00 \, a_5 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5\,1} \, m_5
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_3 \cos(\theta_3) \sin(\theta_3) + 0.5 
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \sin{(\theta_2)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_2)} + 0.5 \log_{
0.5 \log_{2} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) - 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{4}) \sin(\theta_{4}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{4})^{2} \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{3} \cos(\theta_{3}) \cos(\theta_{3}) \sin(\theta_{3}) + 0.5 \log_{1} 2 m_{5} \dot{\theta}_{3} \cos(\theta_{3}) \cos(\theta_{
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)}^2 \sin{(\theta_2)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{}^2 \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 \sin{(\theta_3)} + 0.5 \log_{5,1}{}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{}^2 \cos{(\theta_5)} 
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{}^2 \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_5)} + 0.5 \log_{5,2}{}^2 \cos{(\theta_5)} 
0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 0.5 \log_{5,2}{}^2 \sin{(\theta_4)} + 0.5 \log_{
0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{3})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 0.5 \lg_{5,1}{}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{4})}^{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \sin{(\theta_{5})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{\theta}_{1} \sin{(\theta_{5})} + 0.5 \lg_{5,2}{}^{2} m_{5} \dot{
0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta
0.125\,a_4\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\sin{(1.0\,\theta_5)} - 0.125\,a_4\,\mathrm{lc}_{5,2}\,m_5\,\dot{\theta}_1\,\cos{(1.0\,\theta_5)}\,\sin{(2.0\,\theta_2)} - 0.0625\,a_4\,a_5\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(1.0\,\theta_5)} - 0.0625\,a_4\,a_5\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(1.0\,\theta_5)} - 0.0625\,a_4\,a_5\,m_5\,\dot{\theta}_1\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,\theta_2)}\,\sin{(2.0\,
0.125 a_4 lc_{5.1} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(1.0 \theta_5) + 0.5 I_{vz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(1.0 \theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_3 \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_4 \sin(\theta_5) + 0.5 I_{xz,5} \dot{\theta}_5 \sin(\theta
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0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_1 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}_2 \sin(\theta_4) + 0.5 I_{xz,5} \dot{\theta}
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2
1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2
1.0 I_{xx,5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 1.0 I_{xx,5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_4)^2} \sin{(\theta_2)} + 1.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_4)
1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \sin(\theta_2) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \sin(\theta_2)^2 \sin(\theta_2)
1.0 \, I_{\text{vv.5}} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_5)^2} \sin{(\theta_3)} + 1.0 \, I_{\text{vv.5}} \, \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \, I_{\text{vv.5}} \, \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_3)} + 1.0 \, I_{\text{vv.5}} \, \dot{\theta}_1 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta
1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 1.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta
1.0 \, I_{\text{vv},5} \, \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 1.0 \, I_{\text{vv},5} \, \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 \, I_{\text{vz},5} \, \dot{\theta}_1 \sin{(2.0 \, \theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 0.5 \, I_{\text{vz},5} \, \dot{\theta}_1 \sin{(2.0 \, \theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 0.5 \, I_{\text{vz},5} \, \dot{\theta}_1 \sin{(2.0 \, \theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 0.5 \, I_{\text{vz},5} \, \dot{\theta}_1 \sin{(2.0 \, \theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 0.5 \, I_{\text{vz},5} \, \dot{\theta}_1 \sin{(2.0 \, \theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 0.5 \, I_{\text{vz},5} \, \dot{\theta}_1 \sin{(2.0 \, \theta_2)} \cos{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} - 0.5 \, I_{\text{vz},5} \, \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \, I_{\text{vz},5} \, \dot{\theta}_2 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 \, I_{\text{vz},5} \, \dot{\theta}_2 \cos{(\theta_5)} 
0.5 I_{vz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 I_{vz.5} \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 0.0625 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) + 0.000 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \cos{(2.0\,
0.5 I_{xz,5} \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.125 a_4 \ln \theta_1 \cos(2.0 \theta_2) \cos(\theta_5) + 0.25 a_4 \ln \theta_2 \cos(1.0 \theta_5) \cos(\theta_2) + 0.25 a_4 \ln \theta_3 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) \cos(\theta_5) + 0.25 a_4 \ln \theta_5 \cos(\theta_5) + 0.25 a_4 \ln \theta_5 \cos(\theta_5) \cos(\theta_5) + 0.25 a_4 \ln \theta_5 \cos(\theta_5) \cos(\theta_5
0.5 a_4 lc_{5,2} m_5 \dot{\theta}_3 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) - 0.125 a_4 a_5 m_5 \dot{\theta}_2 \cos(1.0 \theta_5) \sin(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_4 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_4 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(1.0 \theta_5) \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 lc_{5,2} m_5 \dot{\theta}_5 \cos(\theta_2) + 0.5 a_5 lc_{5,2} m_5 lc_{5,2} m_5 lc_{5,2} m_5 lc_{5
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \sin(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \cos(\theta_2) + 0.25 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos(1.0 \, \theta_5) \, \dot{\theta}_3 \, \dot{
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(1.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, I_{\text{XV},5} \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.0 \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4
1.0 I_{\text{xv},5} \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 I_{\text{xv},5} \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) -
0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_2 \, \sin{(1.0\,\theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} + 0.25 \, a_4 \, \mathrm{lc}_{5\,1} \, m_5 \, \dot{\theta}_3 \, \cos{(1.0\,\theta_5)} \, \sin{(\theta_2)} \, d_5 \,
0.5 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} - 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_2)} \, \cos
0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \sin{(1.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_2)} \, \sin{(\theta_5)} + 0.0625 \, a_5 \, a
0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) +
0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 0.5 I_{xx,5} \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) - 0.03125 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} - 0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} + 0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{\text{xx},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta
0.5 I_{\text{VV},5} \dot{\theta}_2 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} + 0.5 I_{\text{VV},5} \dot{\theta}_2 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.
0.5 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \cos{(\theta_2)} - 0.5 a_5 \ln_{5.2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 - 0.5 a_5 \ln_{5.2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 - 0.5 a_5 \ln_{5.2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 + 0.5 a_5 \ln_{5.2} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 + 0.5 a_5 \ln_{5.2} m_5 \dot{\theta}_3 \sin{(\theta_3)}^2 + 0.
0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 0.5 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 0.5 a_5
0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.125 a_4 \log_1 m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_5) + 0.25 a_4 \log_2 m_5 \dot{\theta}_2 \sin(1.0 \theta_5) \sin(\theta_2) + 0.125 a_4 \log_2 m_5 \dot{\theta}_3 \sin(0.0 \theta_5) \sin(0.0 
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(1.0 \, \theta_5)} \, \sin{(\theta_2)} + 0.125 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, ^2 \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_4 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \, \sin{(2.0 \, \theta_5)} + 0.125 \, \mathrm{lc}_{5,1} \, \dot{\theta}_5 \,
0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{5})} \sin{(2.0\,\theta_{4})} + 0.125 \lg_{5.1}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{4})} \cos{(2.0\,\theta_{5})} \sin{(2.0\,\theta_{5})} - 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} - 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos{(2.0\,\theta_{4})} \sin{(2.0\,\theta_{5})} - 0.125 \lg_{5.2}{}^{2} m_{5} \dot{\theta}_{1} \cos{(2.0\,\theta_{3})} \cos
0.125 \lg_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{3}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{4}) - 0.125 \lg_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{3}) - 1.0 \lg_{5} 1 \lg_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} - 1.0 \lg_{5} 1 \lg_{5} 2 m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{5}) \sin(2.0 \theta_{5}) \sin(2.
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 - 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5)^2 + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 +
1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 I_{xv.5} \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5)^2 + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_5)^2 + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5)^2 + 1.0 \log_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5)^2 +
1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 0.03125 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 1.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) - 0.03125 a_5^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) 
1.0\,I_{\text{xv}.5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_2\right)\,\sin\left(\theta_4\right) - 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_5\right)\,\sin\left(\theta_2\right)\,\sin\left(\theta_5\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\sin\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right) + 1.0\,I_{\text{xy},5}\,\dot{\theta}_1\,
1.0\,I_{\text{xv},5}\,\dot{\theta}_1\,\cos\left(\theta_3\right)\,\cos\left(\theta_5\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_5\right) + 1.0\,I_{\text{xv},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\cos\left(\theta_5\right)\,\sin\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_2\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_3\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_4\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_4\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz},5}\,\dot{\theta}_5\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 1.0\,I_{\text{vz}
1.0 I_{\text{vz},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 I_{\text{vz},5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 0.125 \log_{10}^{2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) + 0.00 \log_{10}^{2} \sin(2.0 \theta_5) \sin(\theta_5) \sin(\theta_5)
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0.125 \log_{5.2}^{2} m_5 \dot{\theta}_1 \sin{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} - 1.0 I_{xz,5} \dot{\theta}_2 \cos{(\theta_3)} \sin{(\theta_2)} \sin{(\theta_4)} \sin{(\theta_5)} - 1.0 I_{xz,5} \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_2)} \sin{(\theta_5)} - 1.0 I_{xz,5} \dot{\theta}_2 \cos{(\theta_4)} \sin{(\theta_5)} - 1.0 I_{xz,5} \dot{\theta}_2 \cos{(\theta_5)} \cos{(\theta_5)}
1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.375 a_3 a_5 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) + 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 + 0.00 a_3 \sin(\theta_4) \cos(2.0 \theta_5) \sin(\theta_4) \cos(2.0 \theta_5) \sin(\theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
1.0 I_{\text{vz},5} \dot{\theta}_2 \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} \sin{(\theta_5)} + 0.75 a_3 \text{lc}_{5,1} m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)} + 0.25 a_4 \text{lc}_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_2)} \cos{(\theta_5)} - 0.00 c_{5,1} c_{5,2} c_
0.5 \, a_4 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_5 \, 2 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.125 \, a_5 \, a
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_2) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_2) + 0.25 \, a_5 \,
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(
0.25 I_{\text{xx}.5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_3)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)^2} - 0.25 I_{\text{yy}.5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)}
0.25 I_{\text{yv},5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 I_{\text{yv},5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 +
0.25 a_5 \ln a_5 \ln a_5 = 0.25 a_5 \ln a_5 
0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.75 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, 
0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_2) - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \sin(\theta_4) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_2) \, \sin(\theta_5) - 0.5 \, a_4 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, d\phi_5 
0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.375 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} - 0.5 \, I_{\mathrm{xv},5} \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_
0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.
0.75 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \mathrm{lc}_{5.2} \, 
0.25 I_{xx,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 I_{xx,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_1 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_2 \sin(2.0 \theta_5) \cos(\theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \sin(2.0 \theta_5)^2 + 0.25 I_{yy,5} \dot{\theta}_3 \dot{\theta
0.0625 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(1.0 \, \theta_5)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} + 0.125 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_3
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 \sin(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_3) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) + 0.125 a_5^2 m_5 
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.125
0.125 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.125 a_4 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(1.0 \theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta
0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \,
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_2) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_4 \cos(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5 lc_
0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_5) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2
0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^{2} \, \cos{(\theta_4)}^{2} \, \sin{(\theta_2)} + 1.0 \, \mathrm{lc}_{5.1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)}^{2} \, \cos{(\theta_4)} \, \cos{(\theta_3)}^{2} \, \cos{(\theta_4)}^{2} \, \sin{(\theta_2)} + 1.0 \, \mathrm{lc}_{5.1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)}^{2} \, \cos{(\theta_4)}^{2} \, \sin{(\theta_2)} + 1.0 \, \mathrm{lc}_{5.1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)}^{2} \, \cos{(\theta_4)}^{2} \, \sin{(\theta_2)} + 1.0 \, \mathrm{lc}_{5.1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)}^{2} \, \cos{(\theta_4)}^{2} \, \sin{(\theta_2)} + 1.0 \, \mathrm{lc}_{5.1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)}^{2} \, \cos{(\theta_4)}^{2} \, \cos{(\theta_4)}^{2} \, \sin{(\theta_2)}^{2} \, \sin{(\theta_2)}^{2
1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} + 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \sin{(\theta_2)} + 1.0 \log_{5.2}{}^2 \cos{(\theta_2)} \cos{(
1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} + 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \log_{5.1}{}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} \cos{(\theta_5)}^2 \cos{(
1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 \sin{(\theta_2)} - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)}^2 \sin{(\theta_2)} - 1.0 \log_{5,2}{}^2 \cos{(\theta_2)} \cos{(\theta_
1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) - 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{4}) \sin(\theta_{4}) - 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) + 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) + 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) + 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5}) + 1.0
1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) + 1.0 \log_{10}^{2} m_5 \dot{\theta}_2 \cos(\theta_5)
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1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} - 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 1.0 \log_{5.2}{}^2 \sin{(\theta_4)} + 1.0 \log_{5.2}{}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 1.0 \log_{5.2}{}^2 \cos{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 \cos{(\theta_5)} \cos{(\theta_5)}
1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 1.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5,2}{}^2 \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5,2}{}^2 \cos{(\theta_5)} \cos{(\theta_5)}
1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4}) \cos (\theta_{5})^{2} \sin (\theta_{4}) + 1.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{3})^{2} \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{5}) - 0.125 a_{5}^{2} m_{5} \dot{\theta}_{2} \cos (2.0 \theta_{3}) \cos (2.0 \theta_{4}) \cos (2.0 \theta_{5}) \cos (\theta_{2}) - 0.125 a_{5}^{2} \cos (2.0 \theta_{3}) \cos (2.0 \theta_{5}) \cos (
0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{yy,5} \dot{\theta}_2 \cos(2.0 \theta_5) \cos
0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(\theta_5)}\,\sin{(\theta_4)} - 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} - 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(\theta_4)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(\theta_5)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_3\,\mathrm{lc}_{
0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} - 0.125 \, a_5 \, a_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.125 \, a_5 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \sin{(\theta_5)} + 0.125 \, a_5 \, \dot{\theta}_5 
0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10} 2 \cos(2.0 \theta_5) \cos(2.0 \theta
0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.5 I_{xy.5} \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0
0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 I_{xy,5} \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_2) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0
0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.00 \, \sin{(\theta_5)} - 0
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.125 a_5^2 m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_
0.125 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(2.0 \theta_5) \cos(\theta_2) + 0.25 I_{xx,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) 
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0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_3)} \sin{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_4)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{vv},5} \dot{\theta}_1 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{vv},5} \dot{\theta}_2 \cos{(2.0\,\theta_5)} \sin{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 I_{\text{vv},5} \dot{\theta}_3 \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(\theta_2)} \sin{(2.0\,\theta_5)} \cos{(2.0\,\theta_5)} \cos{(2.0\,\theta_5
0.25 I_{yy,5} \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.25 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_5 \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \cos(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_5 \cos(\theta_5) + 0.25 \log_{10} m_5 \cos(\theta_5) + 0.25 \log_{10} m_5 \cos(\theta_5) + 0.25 \log_{10} m_5 \cos(\theta_5) + 0.25 \log_{
0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 \log_{10}^{20} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5
0.5 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} - 0.5 \log_{5,2}{}^2 \cos{(2.0 \,\theta_5)} \cos{
0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) - 0.5 \log_{5.2}^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(
0.5 I_{xy.5} \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(2.0 
0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 
2.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_3)} - 2.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 2.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_4)} - 2.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_4)} - 2.0 I_{yy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta
0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) - 0.125 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5
0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) - 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.125 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) + 0.125 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) + 0.125 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) + 0.125 a_5 \log_{12} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) + 0.125 a_5 \log_{12} m_5 \cos(2.0 \phi_5) + 0.125 \log_{12} m_5 \cos(2.0 \phi_5) + 0.125 \log_{12} m_5 \cos(2.0 \phi_5) + 0.125 \log_{12} m_5 \cos(2.0 \phi_5) 
0.125 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) + 0.5 a_2 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) + 0.5 a_3 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_3 \log_2 m_5
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.25 \, a_5 
0.25 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \,\theta_3) \sin(2.0 \,\theta_4) \sin(2.0 \,\theta_5) - 0.25 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_3) \sin(2.0 \,\theta_5) - 0.25 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) - 0.25 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \,\theta_4) \sin(2.0 \,\theta_5) - 0.25 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) - 0.25 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) - 0.25 \log_{1.1} \log_{1.1} m_5 \dot{\theta}_1 \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \cos(2.0 \,\theta_5) \sin(2.0 \,\theta_5) \cos(2.0 \,\theta
0.25 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} - 0.125 a_5 \log_{5.1} m_5 \dot{\theta}_1 \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} +
0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_4) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_2 \ln_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \ln_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.
0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.0625 a_5^2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 + 1.0 a_5 \ln_5 2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 + 1.0 a_5 \ln_5 2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^
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1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 1.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.5 a_2 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.0 co(\theta_5)^2 + 0.0 co(
0.5 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} - 0.5 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} + 0.5 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)}
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} - 0.25 \, \mathrm{lc}_{5,1}^{2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 - 0.00 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)}^2 - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \cos{(\theta_2)}^2 +
0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.25 \log_{5} \frac{2}{2} m_{5} \dot{\theta}_{1} \cos(2.0 \theta_{4}) \cos(2.0 \theta_{5}) \sin(2.0 \theta_{3}) \cos(\theta_{2})^{2} - 0.25 a_{2} a_{5} m_{5} \dot{\theta}_{1} \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 0.5 a_{3} a_{5} m_{5} \dot{\theta}_{3} \sin(\theta_{2}) \sin(\theta_{4}) \sin(\theta_{5}) + 0.5 a_{5} \sin(\theta_{5}) \sin(\theta_{5}
2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 + 2.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 + 2.0 \log_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 + 2.0 \log_{5,2} m_5 \dot{\theta}_1 \cos{(\theta_5)}^2 + 2.0 \log_{5,2} m_5 \dot{\theta}_2 \cos{(\theta_5)}^2 + 2.0 \log_{5,2} m_5 \dot{\theta}_3 \cos{(\theta_5)}^2 + 2.0 \log_{5,
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 0.5 a_2 \log_{5.1} m_5 \dot{\theta}_1 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 a_3 \log_{5.1} m_5 \dot{\theta}_3 \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 a_3 \log_{5.1} m_5 \dot{\theta}_3 \sin(\theta_5) + 1.0 a_5 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) + 1.0 a_5 \log_{5.1} m_5 
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \cos(2.0 \, \theta_4) \, \cos(\theta_5) + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \sin(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2)^2 +
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + \frac{1}{2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + \frac{1}{2} \cos(\theta_5) \sin(\theta_5) \sin(\theta_
2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} - 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_4)} \sin{(\theta_5)} + 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_5)^2} + 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} + 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} + 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} + 2.0 I_{xy,5} \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{
0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, \mathrm{lc}_{5.1}^2 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 -
0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_4 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 \log_{5.2}{}^2 \sin(\theta_5) \cos(\theta_5) 
0.25 \, a_4 \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, \text{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)} \, 
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_
0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 4.0 \, I_{xy,5} \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 1.0 \, \sin{(\theta_3)} + 1.0 \, \sin{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, \sin{(\theta_3)} \, \sin{(\theta_3)} + 1.0 \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \cos{(\theta_3)} \, \cos
4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) - 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)
4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) - 0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, a_5 \, 
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) - 0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) - 0.25 \, a_5 \, \dot{\theta}_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \dot{\theta}_5 \, \dot{\theta}_
0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5
0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) - 0.5 a_2 \ln_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_3
0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_3 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \log_{11} m_5 \cos(2.0 \theta_5) \cos(\theta_5) \cos(\theta
0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \cos(\theta_
0.5 \lg_{5,2} \lg_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + 0.5 a_2 \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} \lg_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} \lg_{5,3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) + 0.5 \lg_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(\theta_5) + 0.5 \lg_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 \lg_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.5 \lg_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5) + 0.5 \lg_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5) + 0
0.5 a_2 \ln_2 a_3 + \ln_2 a_4 \ln_2 a_5 + \ln_2 a_5 \ln_2 a_5 + \ln_2 a_5 \ln_2 a_
0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \sin(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \cos(2.0 \theta_5) \cos(2.0 
0.5 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.25 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, m_5 \, d_5 \, d_
0.25 a_5 \log_{3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.25 a_5 \log_{3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) +
0.25 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.25 \, \log{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \,
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0.25 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 \log_{5.2}^{2} \sin(\theta_5) \cos(\theta_5) \cos(\theta_
0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) + 0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) + 0.5 \log_{1.1} \log_{1.1} \log_{1.1} \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_2) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_2) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^
1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_2)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)}
1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)}^2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2
1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin
0.5 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_2) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \cos(\theta_4) \sin(\theta_5) + 0.5 a_3 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) +
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_5)} - 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_5)} + 0.0625 \, a_5^2 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_
0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) + 0.0625 a_5^2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_
0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_2 \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_3 \sin(\theta_5) + 0.5 \log_{5.3} m_5 \dot{\theta}_3
0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 \log_{5.2} \log_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) \sin(\theta_4) + 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
0.5 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.25 a_5 lc_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.05 a_5 lc_{5.1} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) + 0.25 a_5 lc_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.05 a_5 lc_{5.3} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(\theta_2) + 0.25 a_5 lc_{5.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.05 a_5 lc_{5.3} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(2.0 \theta_
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} - 0.25 \log_{5,1}{}^2 \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(
0.25 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{
0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_4)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_5)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_3)} \sin{(2.0 \,\theta_4)} \cos{(\theta_2)} \sin{(\theta_2)} + 0.25 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \sin{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{(2.0 \,\theta_5)} \cos{
0.5 \log_{1.1} \log_{1.3} m_5 \dot{\theta}_1 \sin(2.0 \theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{1.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(\theta_5) - 0.25 a_5 \cos(2.0 \theta_5) \cos(2.0 
0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 
0.5 a_5 \log_2 a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_2 a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 0.5 a_5 \log_2 a_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5)
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) + 1.0 I_{xx.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 I_{xx.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) \sin(
1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) 
1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{\text{yy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) - 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.125 a_4 a_5 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(
0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.125 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)} - 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \cos{(\theta_5)}^2 \, 
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)
1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 1.0 \log_{5,2} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(\theta_5) - 0.25 a_4 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.25 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(2.0 \, 
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) + 0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos
0.5 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) - 1.0 a_2 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 1.0 a_2 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{2}) - 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} \sin(\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3}) \cos(\theta_{5})^{2} \sin(\theta_{3}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} \sin(\theta_{5}) + 2.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{2} \sin(\theta_{5}
2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - 2.0 \log_{5.1}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_2)^2} \cos{(\theta_3)^2} \cos{(\theta_5)^2} \sin{(\theta_2)} - 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(
2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 \sin(\theta_3) - 2.0 \log_{5,2}{}^2 \sin(\theta_3) - 2.0 \log_{5,2}{}^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 \sin(\theta_3) - 2.0 \log_{5,2}{}^2 \sin(\theta_3) - 2.0 \log_{5,2}{}^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 \sin(\theta_3) - 2.0 \log_{5,2}{}^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5,2}{}^2 \cos(\theta_5) \cos(
2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{4}) \cos(\theta_{5})^{2} \sin(\theta_{4}) + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2})^{2} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) +
0.25 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} + 0.5 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)}
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1.0 \, a_1 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_4) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, d\phi_5 \, 
1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} - 0.5 \, a_2 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} - 0.5 \, a_3 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_2) \, \sin(\theta_4) - 0.5 \, a_1 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_2) \, \sin(\theta_3) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 0.5 \, a_2 \, a_3 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 
0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} - 1.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)} \, \cos{(\theta_2)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \,
1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 a_1 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 a_1 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) - 1.0 \log_{5.1} \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 1.0 \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.1} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
1.0 \, a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta
1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 0.5 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos
0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 a_5 \ln c_5 \cos(\theta_5) \cos(\theta_5
0.5 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_2) \sin(\theta_3) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_1 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_1 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2
1.0 \log_2 \log_3 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 1.0 \log_2 \log_3 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_2 \log_3 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
1.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) + 1.0 a_1 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) 
1.0 \, a_1 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)}
0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5,3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} 
0.5 a_1 a_5 m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 1.0 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 1.0 \log_{11} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 1.0 \log_{11} m_5 \dot{\theta}_3 \cos(\theta_5) + 1.0 \log_{11} m_5
1.0 \log_{11} \log_{12} \sin(\theta_2) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 a_5 \log_{12} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2)^2 +
0.25\,a_3\,\mathrm{lc_{5.1}}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_2)}\,\cos{(2.0\,\theta_3)}\,\cos{(\theta_4)}\,\cos{(\theta_5)} - 0.5\,a_4\,\mathrm{lc_{5.2}}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\cos{(\theta_5)} + 0.5\,a_4\,\mathrm{lc_{5.2}}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)} + 0.5\,a_4\,\mathrm{lc_{5.2}}\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_5)} + 0.5\,a_4\,\mathrm{lc_{5.2}}\,m_5\,\dot{\theta}_2\,m_5\,\dot{\theta}_2\,m_5\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3\,\dot{\theta}_3
1.0 \, a_1 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(\theta_5)} - 0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_4)}
0.25\,a_4\,a_5\,m_5\,\dot{\theta}_2\,\cos{(2.0\,\theta_4)}\,\sin{(2.0\,\theta_3)}\,\cos{(\theta_2)}\,\cos{(\theta_5)} - 0.5\,\mathrm{lc}_{5.1}\,\mathrm{lc}_{5.2}\,m_5\,\dot{\theta}_1\,\cos{(2.0\,\theta_3)}\,\cos{(2.0\,\theta_4)}\,\cos{(2.0\,\theta_5)}\,\cos{(\theta_2)}^2 -
1.0 \log_{5,2} \log_{5,3} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5 \log_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{5,2} \log_{5,2} m_5 \dot{\theta}_2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5 \log_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{5,2} m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5 \log_{5,2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) 
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \sin(2.0 \theta_3) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 - 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \sin(2.0 \theta_5) \sin(2.
0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d\phi_5 
0.25 a_3 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_4) \cos(\theta_5) - 0.5 a_4 \log_1 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_1 m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - 0.5 a_4 \log_1 m_5 \dot{\theta}_3 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 \log_1 m_5 \dot{\theta}_4 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 a_4 \log_1 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 a_5 \log_1 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 a_5 \log_1 m_5 \dot{\theta}_5 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(\theta_5) - 0.5 a_5 \log_1 m_5 \dot{\theta}_5 \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} - 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_5)} + 0.5 \, a_5 \, 
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \cos(2.0 \, \theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_4) \, \sin(\theta_5) - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \sin(\theta_5) - 0.125 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(2.0 \, \theta_3) \, \cos(\theta_5) \, d_5 \, d_5
0.125 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_2) \, \sin(2.0 \, \theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 0.25 \, a_5 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_4) \, \sin(2.0 \, \theta_5) \, \cos(\theta_2)^2 + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_4) + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_4) + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_4) + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_4) + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_4) + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \sin(\theta_4) + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_4) + 0.00 \, \log_{5.2} m_5 \, \dot{\theta}_1 \, \cos(2.0 \, \theta_3) \, \sin(2.0 \, \theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta
0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2)^2 - 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_2 m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \cos(2.0
0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_2)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.25 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(2.0 \, \theta_3)} \, \cos
0.25 a_3 \log_{10} 1 m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_5) \sin(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(\theta_5) + 0.5 a_4 \log_{10} m_5 \dot{\theta}_4 \cos(2.0 \theta_5) \sin(2.0 \theta_5) 
0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_5)} \, d_5 \, d_5
0.25 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, \text{lc}_{5.1} \, \text{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \sin{(2.0 \, \theta_4)} \, \sin{(2.0 \, \theta_5)} \, \cos{(\theta_2)}^2 +
0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_3) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2)^2 + 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \lg_{5.1} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.5 \lg_{5.2} \lg_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin
0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_2) \sin(2.0 \theta_3) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_3 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2)^2 + 0.25 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_5) \cos(\theta_5)
0.5 a_4 lc_{5,1} m_5 \dot{\theta}_2 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_5) - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 2.0 a_5 lc_{5,2} m_5 \dot{\theta}_3 \cos(\theta_5)^2 - 2.0 a_5
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 0.25 a_5 \log_{5.1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.00 \cos(2.0 \theta_4) \cos(2.0 \theta_5) \cos
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0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_
0.25 a_5 \lg_5 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 \lg_5 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 \lg_5 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 \lg_5 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - 0.25 a_5 \lg_5 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - 0.25 a_5 \lg_5 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \sin(\theta_2) - 0.25 a_5 \lg_5 2 m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \sin(2.0
0.25 a_5 lc_{5,2} m_5 \dot{\theta}_1 \cos{(2.0 \theta_4)} \cos{(2.0 \theta_5)} \sin{(2.0 \theta_3)} \cos{(\theta_2)} \sin{(\theta_2)} - 1.0 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(
1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_4)} - 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)
1.0 \log_{5,2}{^2} m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_2)} \sin{(\theta_3)} \sin{(\theta_5)} - 1.0 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_2)} \sin{(\theta_5)} + 1.0 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \log_{5,1}{^2} m_5 \dot{\theta}_1 \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} 
1.0 \log_{5.2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_2)} \sin{(\theta_4)} \sin{(\theta_5)} + 1.0 \log_{5.1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_3)} \cos{(\theta_4)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_5)} - 1.0 \log_{5.2}{}^2 \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)} \sin{(\theta_5)} \cos{(\theta_5)} \cos{(\theta_5)}
1.0 \log_{5.2}^2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.5 \log_{5.2} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(\theta_4) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(2.0 \theta_5
0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_3)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_4)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_4)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_3)} \, \cos{(\theta_2)} \, \sin{(\theta_2)} - 0.5 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \cos{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)} \, \sin{(2.0 \, \theta_5)}
0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 0.25 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(
0.25 a_5 \ln a_5 \ln a_5 d_1 \cos (2.0 \theta_5) \sin (2.0 \theta_3) \sin (2.0 \theta_4) \cos (\theta_2) \sin (\theta_2) + 0.25 a_5 \ln a_5 d_1 \sin (2.0 \theta_3) \sin (2.0 \theta_4) \sin (2.0 \theta_5) \cos (\theta_2) \sin (\theta_2) + 0.25 a_5 \ln a_5 d_1 \sin (2.0 \theta_3) \sin (2.0 \theta_4) \sin (2.0 \theta_5) \cos (\theta_2) \sin (\theta_2) + 0.25 a_5 \ln a_5 d_1 \sin (2.0 \theta_3) \sin (2.0 \theta_4) \sin (2.0 \theta_5) \cos (\theta_2) \sin (\theta_2) + 0.25 a_5 \ln a_5 d_1 \sin (2.0 \theta_4) \sin (2.0 \theta_5) \cos (\theta_2) \sin (\theta_2) + 0.25 a_5 \ln a_5 d_1 \sin (2.0 \theta_4) \sin (2.0 \theta_5) \sin (2.0 \theta_5
0.5 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \sin(2.0 \theta_3) \sin(2.0 \theta_4) \sin(2.0 \theta_5) \cos(\theta_2) \sin(\theta_2) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_2) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) - 2.0 a_5 \log_{1.1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \cos
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 2.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
2.0 I_{\text{xx}} = \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{\text{yy}} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{\text{yy}} = \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + 2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_2) \sin(\theta_3) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) - 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_2) \sin(\theta_4) - 1.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 1.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 1.0 \log_{10} \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) \sin(\theta_4) - 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) \sin(\theta_5) \sin(\theta_6) \sin(\theta
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2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2} m_5 \dot{\theta}_5 \cos(\theta_5) 
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_2) \sin(\theta_3) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{1.1} \log_{1.
4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2)^2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 \log_{1.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(
1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_2) \sin(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta
1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(
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0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)}^2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)}^2 \, \sin{(\theta_5)}^2 \, \sin{(\theta
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(A48)

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C_{52} = 1.0 I_{\text{xy}} \cdot 5 \dot{\theta}_2 - 2.0 I_{\text{xy}} \cdot 5 \dot{\theta}_2 \cos(\theta_3)^2 - 2.0 I_{\text{xy}} \cdot 5 \dot{\theta}_2 \cos(\theta_4)^2 - 2.0 I_{\text{xy}} \cdot 5 \dot{\theta}_2 \cos(\theta_5)^2 - 0.5 I_{\text{xy}} \cdot 5 \dot{\theta}_1 \cos(\theta_2) + 0.0 I_{\text{xy}} \cdot 5 \dot{\theta}_2 \cos(\theta_5)^2 - 0.0 I_{\text{xy}} \cdot 5 \dot{\theta}_3 \cos(\theta_5)^2 - 0.0 I_{\text{xy}} \cdot 5 \dot{\theta}_4 \cos(\theta_5)^2 - 0.0 I_{\text{xy}} \cdot 5 \dot{\theta}_5 \cos(\theta_5
0.5 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) - 0.5 I_{\text{zz},5} \dot{\theta}_1 \cos(\theta_2) - 0.5 a_5 \lg_{5,2} m_5 \dot{\theta}_2 - 1.0 \lg_{5,1} \lg_{5,2} m_5 \dot{\theta}_2 + 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 + 1.0 \lg_{5,2} m_5 \dot{\theta}_2 + 1.0 \lg_{5,2} m_5 \dot{\theta}_3 + 1.0 l_{5,2} m_5 \dot{\theta}_3 + 1.0 l_{5,2} m_5 \dot{\theta}_3 + 1.
1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 + 1.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 - 1.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_3) 
1.0\,I_{\text{yy},5}\,\dot{\theta}_{1}\,\cos{(\theta_{2})}\,\cos{(\theta_{5})^{2}}+4.0\,I_{\text{xy},5}\,\dot{\theta}_{2}\cos{(\theta_{3})^{2}}\cos{(\theta_{4})^{2}}+4.0\,I_{\text{xy},5}\,\dot{\theta}_{2}\cos{(\theta_{5})^{2}}+4.0\,I_{\text{xy},5}\,\dot{\theta}_{2}\cos{(\theta_{5})^{2}}+4.0\,I_{\text{xy},5}\,\dot{\theta}_{2}\cos{(\theta_{5})^{2}}
1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 I_{yy,5} \dot{\theta}_3 \cos(\theta_3) \cos
1.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 1.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{10} 2 m_5 \dot{\theta}_1 \cos(\theta_2) - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 0.00 \cos(\theta_3) \sin(\theta_5) + 0.00 \cos(\theta_5) \cos(\theta_5
0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 - 0.25 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5)^2 + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 2.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5)^2 \sin(\theta_5)^2 
2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 2.0 I_{xx.5} \dot{\theta}_3 \cos(\theta_5) + 2.0 I_{xx.5
2.0 I_{xx.5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{yy.5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 2.0 I_{yy.5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{yy.5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 2.0 I_{yy.5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{yy.5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_5) - 2.0 I_{yy.5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{yy.5} \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 2.0 I_{yy.5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{yy.5} \dot{\theta}_5 \cos(\theta_5) - 2.0 I_{yy.5} \dot{\theta
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) - 2.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta
2.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 1.0 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 - 1.0 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 lc_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5
1.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} - 1.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{5})^{2} + 1.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{4})^{2} + 1.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{5})^{2} + 1.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} + 1.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{3})^{
1.0 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3)^2 + 1.0 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 1.0 a_5 \log_{12} m_5 \dot{\theta}_2 \cos(\theta_5)^2 + 2.0 \log_{11} \log_{12} m_5 \dot{\theta}_2 \cos(\theta_3)^2 +
2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 + 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 - 2.0 I_{\text{xx},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 - 2.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(
2.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 I_{yy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_4) - 2.0 I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{\text{xy},5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_3) - 2.0 I_{\text{xy},5} \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 2.0 I_{\text{xy},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{\text{xy},5} \dot{\theta}_3 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) - 2.0 I_{\text{xy},5} \dot{\theta}_3 \cos(\theta_3) \cos(
2.0\,I_{\rm xy,5}\,\dot{\theta}_1\,\cos{(\theta_2)}\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_3)}\,\sin{(\theta_3)} + 0.25\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_4)}\,\sin{(\theta_4)} + 0.25\,a_5{}^2\,m_5\,\dot{\theta}_2\,\cos{(\theta_5)}\,\sin{(\theta_5)} + 0.25\,a_5{}^2\,
8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) - 1.0 l_{5,2}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) - 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_2 \cos(\theta_5) + 1.0 l_{5,1}^2 m_5 \dot{\theta}_3 \cos(\theta_5) + 1.
1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 1.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5,2}{}^2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5,2}{}^2 \cos(\theta_5) \cos(\theta_5)
2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \sin{(\theta_3)} + 2.0 \log_{5,2}{}^2 \sin{(\theta_3)} + 2.0 \log_{5,2}{}^2 \sin{(\theta_3)} + 2.0 \log_{5,2}{}^2 \cos{(\theta_3)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5,2}{}^2 \cos{(\theta_4)} 
2.0 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} + 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_4)} - 2.0 \log_{5,1}{^2} m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 2.0 \log_{5,2}{^2} \sin{(\theta_4)} + 2.0 \log_{5,2}{^2} \sin{(\theta_4)} + 2.0 \log_{5,2}{^2} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{5,2}{^2} \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 2.0 \log_{5,2}{^2} \cos{(\theta_5)} \cos{(\theta_5)
2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} - 2.0 \log_{5,1}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} + 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} + 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{4})} \cos{(\theta_{5})^{2}} \sin{(\theta_{4})} + 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})} \sin{(\theta_{5})} + 2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{2} \sin{
2.0 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 \log_{5,2}{^2} m_5 \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} + 0.5 a_4 a_5 m_5 \dot{\theta}_2 \cos{(\theta_5)} + 0.5 a_5 a_5 a_5 \cos{(\theta_5)} + 0.5 a_5 a_5 a_5 \cos{(\theta_5)} + 0.5 a_5 a_5 a_5 \cos{(\theta_5)} \cos{(\theta_5)} + 0.5 a_5 a_5 \cos{(\theta_5)} \cos
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)^2} \cos{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} - 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)^2} - 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_3)^2} + 1.0 \, a_5 \, \mathrm{lc}_{5.1
1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \sin{(\theta_5)} -
1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)}^2 \sin{(\theta_5)} + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \cos{(\theta_3)}^2 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, m_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, a_5^2 \, \dot{\theta}_3 \cos{(\theta_5)}^2 + 0.5 \, 
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_5)^2 \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta
4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{yy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{vv,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{vv,5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{vv,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{vv,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{vv,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 4.0 I_{vv,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5) + 4.0 I_{vv,5} \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 
4.0 I_{\text{vv.5}} \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 2.0 I_{\text{cs.1}}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_4)^2} + 2.0 I_{\text{cs.1}}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)^2} \cos{(\theta_5)^2} - \frac{1}{2} (1 + 1)^2 \sin{(\theta_5)^2} \cos{(\theta_5)^2} 
2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} - 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} - 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} - 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} - 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{5})^{2} + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{5})^{2} + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{2} \sin(\theta_{5})^{2} + 2.0 \log_{5} 2^{2} m_{5} \dot{\theta}
2.0 \log_{5,2}^{2} m_{5} \dot{\theta}_{1} \cos{(\theta_{2})} \cos{(\theta_{4})^{2}} \cos{(\theta_{5})^{2}} - 2.0 a_{5} \log_{5,2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})^{2}} \cos{(\theta_{4})^{2}} - 2.0 a_{5} \log_{5,2} m_{5} \dot{\theta}_{2} \cos{(\theta_{3})^{2}} \cos{(\theta_{5})^{2}} - 2.0 a_{5} \log_{5,2} m_{5} \dot{\theta}_{2} \cos{(\theta_{5})^{2}} + 2.0 \log_{5,2} m_{5} \dot{\theta}_{2} + 2.
2.0 a_5 lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5)^2 - 4.0 lc_{5,1} lc_{5,2} m_5 \dot{\theta}_2 \cos(\theta_5)^2 - 4.0 lc_{5,2} lc_{5,2} m_
4.0 \log_{1.1} \log_{1.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 \log_{1.2} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 \log_{1.2} m_5 \dot{\theta}_3 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{1.2} m_5 \dot{\theta}_4 \cos(\theta_5)^2 \cos(\theta_5)^2 + 1.0 \log_{1.2} m_5 \dot{\theta}_5 \cos(\theta_5)^2 + 1.0 \log_{1.2} m_
4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 I_{\text{xv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 4.0 I_{\text{xv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 4.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
4.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{yz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) \sin(\theta_5) - 1.0 I_{yz,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 1.0 I_{yz,5} \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) - 1.0 I_{yz,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{yz,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{yz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{yz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{yz,5} \dot{
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1.0 I_{yz,5} \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 I_{xz,5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
1.0 I_{xz,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 0.5 a_3 a_5 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) + 1.0 I_{yz,5} \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{yz,5} \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 I_{yz,5} \dot{\theta}_1 \sin(\theta_5) \sin
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_3)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)
1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathbf{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, d_5 \, 
4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) + 4.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_3) \cos(\theta_3)
4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xy.5} \dot{\theta}_3 \cos(\theta_5) 
0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \sin(\theta_3) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5)^2 \sin(\theta_3) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_4)^2 \sin(\theta_4) - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \cos
0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_5)} \sin{(\theta_5)} + 0.
1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)}^2 
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_5)}^2 \sin{(\theta_3)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_5)} \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \cos{(\theta_5)} \cos{(\theta_5)}^2 \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \cos{(\theta_5)}
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) - 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 0.5 a_3 a_5 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_4) \sin(\theta_5) + 1.0 a_3 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_4) \sin(\theta_5) - 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \sin(\theta_5) + 0.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 0.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) + 0.0 a_5 lc_{5,1} m_5 
8.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) - 8.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 8.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 8.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 8.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_4) - 8.0 I_{xy.5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^
8.0 I_{xy} = \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_5) + 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5)^2 
1.0 a_5^2 m_5 \dot{\theta}_2 \cos{(\theta_3)^2} \cos{(\theta_4)^2} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \log_{11}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)^2} \cos{(\theta_5)^2} \sin{(\theta_3)} + 4.0 \log_{11}^2 m_5 \dot{\theta}_2 \cos{(\theta_4)} \cos{(\theta_5)^2} \sin{(\theta_4)} - 4.0 \log_{11}^2 m_5 \dot{\theta}_2 \cos{(\theta_5)^2} \sin{(\theta_5)} + 4.0 \log_{11}^2 m_5 \dot{\theta}_3 \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2} \sin{(\theta_5)^2} \cos{(\theta_5)^2} \cos{(\theta_5)^2}
4.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)} \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_3)} + 4.0 \log_{5,1}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)} \sin{(\theta_5)} - 4.0 \log_{5,2}{}^2 m_5 \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} - 4.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 4.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 4.0 \log_{5,2}{}^2 \sin{(\theta_5)} + 4.0 \log_{5,2}{}^2 \cos{(\theta_5)} \cos{(
4.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 a_{4} a_{5} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} + 4.0 \log_{10} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 a_{4} a_{5} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) \sin(\theta_{5}) - 1.0 a_{4} a_{5} m_{5} \dot{\theta}_{2} \cos(\theta_{3})^{2} \cos(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{2} \cos(\theta_{5}) \sin(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \cos(\theta_{5}) \sin(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) + 2.0 a_{5} \log_{10} m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \sin(\theta_{5}) \cos(\theta_{5}) \cos(\theta_
2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5)^2 + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5)^2 - 2.0 a_4 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) + 2.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos
2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right)^2 \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_2\right) \cos \left(\theta_3\right) \cos \left(\theta_4\right) \sin \left(\theta_3\right) \sin \left(\theta_4\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_3\right) \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_1 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_2 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_3 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_4 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \, \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \, \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5 \, \cos \left(\theta_5\right) \, \sin \left(\theta_5\right) + 2.0 \, I_{\mathrm{xx},5} \, \dot{\theta}_5
2.0\,I_{\text{xx},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_4\right)\,\cos\left(\theta_5\right)\,\sin\left(\theta_4\right)\,\sin\left(\theta_5\right) - 2.0\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)\,\cos\left(\theta_4\right)\,\sin\left(\theta_3\right)\,\sin\left(\theta_4\right) - 2.0\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos\left(\theta_2\right)\,\cos\left(\theta_3\right)\,\sin\left(\theta_5\right) - 2.0\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 2.0\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 2.0\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos\left(\theta_4\right)\,\sin\left(\theta_5\right) - 2.0\,I_{\text{yy},5}\,\dot{\theta}_1\,\cos\left(\theta_5\right)\,\sin\left(\theta_5\right) - 2.0
2.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 4.0 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 4.0 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5)^2 + 4.0 lc_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)
4.0 \log_{5} 2^{2} m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{3})^{2} \cos(\theta_{4})^{2} \cos(\theta_{5})^{2} + 1.0 a_{3} \log_{5} 2 m_{5} \dot{\theta}_{1} \cos(\theta_{2}) \cos(\theta_{4}) \cos(\theta_{5}) + 1.0 a_{2} \log_{5} 2 m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) + 1.0 a_{5} \log_{5} 2 m_{5} \dot{\theta}_{2} \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5}) + 1.0 a_{5} \log_{5} 2 m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \cos(\theta_{5}) + 1.0 a_{5} \log_{5} 2 m_{5} \dot{\theta}_{3} \cos(\theta_{5}) \cos(\theta_{5})
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 0.5 \, a_2 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_4) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 
0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) + 0.5 a_2 a_5 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 1.0 a_3 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5 lc_{5,1} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta
1.0 \, a_3 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) 
1.0 \, a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_2 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5
1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)}
0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_4) \, \sin(\theta_4) \, \sin(\theta_5) + 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \sin(\theta_3) + 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \sin(\theta_3) + 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \sin(\theta_3) + 2.0 \, \mathrm{lc}_{5,1} \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \sin(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_3) \, \sin(\theta_3) \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \,
2.0 \log_{11} \log_{12} m_5 \,\dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_4)} \sin{(\theta_4)} + 2.0 \log_{11} \log_{12} m_5 \,\dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_5)} \sin{(\theta_5)} + 4.0 \,a_5 \log_{12} m_5 \,\dot{\theta}_2 \cos{(\theta_4)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 - 4.0 \,a_5 \log_{12} m_5 \,\dot{\theta}_2 \cos{(\theta_5)} \cos{(\theta_5)}
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_2 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)}
1.0 a_2 \log_2 a_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 1.0 a_4 \log_1 a_5 \dot{\theta}_2 \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) - 1.0 a_4 \log_1 a_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) \sin(\theta_5) - 1.0 a_4 \log_1 a_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) - 1.0 a_4 \log_1 a_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \log_1 a_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \log_1 a_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \log_1 a_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \log_1 a_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 a_5 \log_1 a_5 \cos(\theta_5) \cos(\theta_5)
0.5 a_2 a_5 m_5 \dot{\theta}_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 8.0 \log_{10} \log_{10} \theta_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 - 1.0 a_2 \log_{10} \theta_2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.0 \log_{10} \theta_2 \sin(\theta_5) \cos(\theta_5)^2 + 0.0 \log_{10} \theta_3 \sin(\theta_5) \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5)^2 \cos(\theta_5
8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) + 8.0 I_{xy,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_
8.0 I_{xy.5} \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 0.5 a_3 a_5 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) + 1.0 a_4 lc_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) - 0.5 a_3 a_5 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \cos \left(\theta_3\right)^2 \cos \left(\theta_4\right) \cos \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_4\right)^2 \cos \left(\theta_5\right) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_2\right) \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_5\right) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \cos \left(\theta_3\right)^2 \sin \left(\theta_3\right
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0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 2.0 \, a_4 \, \text{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \cos{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} - 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 1.0 \, a_5 \, 
2.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \, \sin{(\theta_3)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)} \cos{(\theta_5)}^2 \sin{(\theta_4)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_3)}^2 \cos{(\theta_4)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \cos{(\theta_5)}^2 \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_3 \cos{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{(\theta_5)}^2 \sin{(\theta_5)}^2 \cos{
4.0 a_5 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5 \sin(\theta_4) \cos(\theta_4) \sin(\theta_5) \cos(\theta_4) \sin(\theta_5) \cos(\theta_4) \sin(\theta_5) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) 
0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta}_5 \cos(\theta_5) + 0.5 a_5^2 m_5 \dot{\theta
4.0 I_{\text{xx},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) - 4.0 I_{\text{yy},5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) - 2.0 \log_{5,1}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) - 2.0 \log_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_2 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_4) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_3 \cos(\theta_4) \sin(\theta_5) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_3 \cos(\theta_5) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_3 \cos(\theta_5) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_4 \cos(\theta_5) + 2.0 \log_{5,2}^2 m_5 \dot{\theta}_5 \cos(\theta_5
2.0 \log_{5,1}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_5)} + 2.0 \log_{5,2}{}^2 m_5 \dot{\theta}_1 \cos{(\theta_2)} \cos{(\theta_3)} \cos{(\theta_5)} \sin{(\theta_3)} \sin{(\theta_5)} -
2.0 \log_{5.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 2.0 \log_{5.1}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 2.0 \log_{5.2}^{2} m_5 \dot{\theta}_
1.0 \, a_2 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_
1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) \, \dot{\theta}_3 \, \cos(\theta_5) \, \dot{\theta}_3 \, \cos(\theta_5) \, \dot{\theta}_3 \, \cos(\theta_5) \, \dot{\theta}_3 \, \dot{\theta}_3 \, \cos(\theta_5) \, \dot{\theta}_3 \, \dot{\theta}_3
1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) 
0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 0.5 a_2 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta
1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 4.0 a_5 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5)^2 + 1.0 a_2 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
1.0 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) + 1.0 a_2 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 1.0 a_4 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \sin(\theta_5) + 1.0 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 1.0 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) - 1.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_4) \, \sin(\theta_4) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_5 \, \cos(\theta_5) \, \sin(\theta_5) \, d_5 \, d_
2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 2.0 a_5 \ln c_5 2 m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5
4.0 \, \mathrm{lc}_{5.1} \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_2)} \, \sin{(\theta_5)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 1.0 \, \mathrm{lc}_{5.2} \, \mathrm{lc}_{5.3} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \cos{(\theta_4)} \, \cos{(\theta
1.0 \log_2 \log_3 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) + 4.0 \log_1 \log_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 \log_1 \log_2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_1 \log_2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_1 \log_2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_1 \log_2 \cos(\theta_5) \sin(\theta_5) + 4.0 \log_2 \cos(\theta_5) \cos
1.0 \, a_2 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, \mathrm{lc}_{5 \, 3} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.0 \, \mathrm{lc}_{5 \, 2} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{
0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 \log_3 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_4) + 1.0 \log_1 \log_3 m_5 \dot{\theta}_1 \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 0.5 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_5) 
1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 1.0 \log_{5.1} \log_{5.3} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(
4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{xx,5} \dot
4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 I_{\text{vv},5} \dot{\theta}_5 \cos(\theta_5) \cos(\theta_
4.0 I_{\text{vv},5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \text{lc}_{5,3} m_5 \dot{\theta}_1 \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \sin(\theta_4) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \cos(\theta_5) \sin(\theta_5) - 1.0 \text{lc}_{5,2} \cos(\theta_5) \sin(\theta_5) - 1.0 \text{lc}_{5,3} \cos(\theta_5) \sin(\theta_5) - 1.0 \text{lc}_{5,4} \cos(\theta_5) \sin(\theta_5) - 1.0 \text{lc}_{5,5} \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 \text{lc}_{5,5} \cos(\theta_5) \cos(
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 0.5 \, a_5 \, a
1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} - 1.0 \, a_3 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{
2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, \cos{(\theta_3)} \, -2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_3)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos
2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \,
4.0 \log_{10} \log_{
4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) - 4.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) \cos(\theta_5) \cos(\theta_5)
4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) - 4.0 \log_{5,1} \log_{5,2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) +
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)}
4.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 4.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 4.0 \log_2 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5)^2 \sin(\theta_5)^2 \sin(\theta_5)^2
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4.0 a_5 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5)^2 \sin(\theta_3) + 8.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_1 \log_2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_2 m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 8.0 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 8.0 \log_2 m_5 \dot{\theta}_5 \cos(\theta_5) 
8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_4) + 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_5) + 8.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 8.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 8.0 \log_{5.2} \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 8.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 8.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5)^2 \sin(\theta_5) + 8.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 8.0 \log_{5.2} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5)
8.0 I_{xy,5} \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) - 1.0 a_5^2 m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) - 4.0 \, \mathrm{lc_{5,1}}^2 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 1.0 \, \mathrm{lc_{5,1}}^2 \, \mathrm{lc_{5,1}}^2
4.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 a_3 \log_{5.1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) + 1.0 \log_{5.2}^{2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.2}^{2} m_5 \dot{\theta}_3 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.2}^{2} m_5 \dot{\theta}_4 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) - 1.0 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2}^{2} m_5 \dot{\theta}_5 \cos(\theta_5) \sin(\theta_5) + 1.0 \log_{5.2}^{2} m_5 \dot{\theta}_
1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) \, \sin(\theta_5) + 1.0 \, a_5 \,
1.0 \, a_3 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_5)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} - 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_4)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, 
2.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 2.0 a_5 \log_{10} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 2.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 a_4 \log_{10} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 a_5 \log_{10} m_5 \dot{\theta}_3 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 2.0 a_5 \log_{10} m_5 \dot{\theta}_4 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
2.0 \, a_5 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, m_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 0.5 \, a_5 \, a_5 \, a_5 \, a_5 \, a_5 \, \dot{\theta}_5 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, \dot{\theta}_5 \, d_5 \, d_5
1.0 \, a_3 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_3)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, d_5 \, d_
1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) + 1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) + 1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_
1.0 a_5^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 4.0 \log_{10}^2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
4.0 \log_{10} 2 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 4.0 \log_{10} 2 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) + 4.0 \log_{10} 2 \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{10} 2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) + 4.0 \log_{10} 2 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
4.0 \log_{5.1}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3})^{2} \cos (\theta_{4}) \cos (\theta_{5}) \sin (\theta_{4}) \sin (\theta_{5}) - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \cos (\theta_{4})^{2} \cos (\theta_{5}) \sin (\theta_{3}) \sin (\theta_{5}) - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \cos (\theta_{5}) \sin (\theta_{3}) \sin (\theta_{5}) - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{2}) \cos (\theta_{3}) \cos (\theta_{5}) \sin (\theta_{5}) \sin (\theta_{5}) - 4.0 \log_{5.2}^{2} m_{5} \dot{\theta}_{1} \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (\theta_{5}) \cos (\theta_{5}) \sin (\theta_{5}) \cos (
4.0 \log_{5.2}^{2} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 1.0 a_4 a_5 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) - 1.0 a_4 a_5 a_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) - 1.0 a_4 a_5 a_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^2 \cos(\theta_5) \sin(\theta_3) - 1.0 a_4 a_5 a_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3)^2 \cos(\theta_3)^
1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_4) \, \cos(\theta_5) \, \sin(\theta_4) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3)^2 \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_2 \, \cos(\theta_3) \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_3) \, d\phi_3 \, d\phi_3 \, d\phi_3 \, d\phi_4 \, d\phi_5 
2.0 \, a_4 \, \mathrm{lc}_{5.1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_4 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 2.0 \, a_5 \, \mathrm{lc}_{5.2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, d
2.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \cos{(\theta_5)}^2 \, \sin{(\theta_3)} \, \sin{(\theta_4)} - \frac{1}{2} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, \cos{(\theta_5)} \, \cos
4.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 4.0 a_5 \log_2 m_5 \dot{\theta}_2 \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) -
8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) - 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_3) \sin(\theta_5) - 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4)^2 \cos(\theta_5) \sin(\theta_5) - 8.0 \log_{5.1} \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) - 8.0 \log_{5.2} m_5 \dot{\theta}_2 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(
8.0 \log_{11} \log_{12} \cos(\theta_3)^2 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) + 2.0 a_4 \log_{12} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) + 3.0 \log_{12} \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) \sin(\theta_6) \cos(\theta_5) \sin(\theta_6) \cos(\theta_5) \sin(\theta_6) \cos(\theta_5) \sin(\theta_6) \cos(\theta_5) \sin(\theta_6) \cos(\theta_5) \sin(\theta_6) \cos(\theta_6) \cos(
1.0 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) - 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_4) \, \sin(\theta_5) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_3) \, \sin(\theta_5) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_2) \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_5) + 2.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5) \, \sin(\theta_5) \, \cos(\theta_5) \, \cos(\theta_5
4.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_2 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5)^2 \sin(\theta_5) \sin(\theta_5) + 4.0 a_5 lc_{5,1} m_5 \dot{\theta}_1 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos
4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)}^2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)}^2 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_2)} \, \cos{(\theta_3)} \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} - 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_2 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 4.0 \, a_5 \, \mathrm{lc}_{5 \, 1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \cos{(\theta_5)} \, \sin{(\theta_5)} \, d
4.0 a_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8.0 \ln c_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8.0 \ln c_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \ln c_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \ln c_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_2) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 8.0 \ln c_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - 8.0 \ln c_5 \ln c_5 2 m_5 \dot{\theta}_1 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_
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(A49)

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C_{53} = 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} + 1.0 \, a_4 \, l_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} + 1.0 \, a_4 \, l_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos{(\theta_5)} - 1.0 \, a_4 \, l_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin{(\theta_5)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} + 1.0 \, a_3 \, l_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \cos{(\theta_5)} - 0.0 \, a_4 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_4)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_3 \, \cos{(\theta_5)} \, \sin{(\theta_4)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_4 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_2)} \, \sin{(\theta_5)} - 1.0 \, a_3 \, l_{5,1} \, m_5 \, \dot{\theta}_3 \, \sin{(\theta_4)} \, \sin{(\theta_5)} - 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, l_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \cos{(\theta_5)} \, \sin{(\theta_2)} - 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_4)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_4)} + 0.5 \, a_3 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos{(\theta_5)} \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} + 1.0 \, a_3 \, l_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin{(\theta_5)} +
```

 $C_{54} = 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) + 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_3 \, \cos(\theta_5) + 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_4 \, \cos(\theta_5) - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_4 \, \sin(\theta_5) - 0.5 \, a_4 \, a_5 \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_2) - 1.0 \, a_4 \, \mathrm{lc}_{5,1} \, m_5 \, \dot{\theta}_1 \, \cos(\theta_5) \, \sin(\theta_2) + 1.0 \, a_4 \, \mathrm{lc}_{5,2} \, m_5 \, \dot{\theta}_1 \, \sin(\theta_2) \, \sin(\theta_5)$ (A51)

 $C_{55} = 0$ (A52)

C. Gravity Vector (G(q))

We can derive the gravity vector as follows:

$$G(q) = \begin{bmatrix} G_1 \\ G_2 \\ G_3 \\ G_4 \\ G_5 \end{bmatrix} \tag{A53}$$

where

```
G_1 = 0.5 a_1 q m_1 \cos(\theta_1) + 1.0 a_1 q m_2 \cos(\theta_1) + 1.0 a_1 q m_3 \cos(\theta_1) + 1.0 a_1 q m_4 \cos(\theta_1) + 1.0 a_1 q m_5 
1.0 q \ln m_1 \cos(\theta_1) - 1.0 q \ln m_2 \sin(\theta_1) - 1.0 q \ln m_1 \sin(\theta_1) + 1.0 q \ln m_2 \cos(\theta_1) \cos(\theta_2) + 1.0 q \ln m_3 \cos(\theta_2) + 
1.0 g \log_{4.3} m_4 \cos(\theta_1) \cos(\theta_2) + 1.0 g \log_{5.3} m_5 \cos(\theta_1) \cos(\theta_2) - 0.5 a_2 g m_2 \cos(\theta_1) \sin(\theta_2) - 1.0 a_2 g m_3 \cos(\theta_1) \cos(\theta_2) - 1.0 a_2 g m_3 \cos(\theta_2) - 1.0 a_2
1.0 \, a_2 \, q \, m_4 \cos(\theta_1) \sin(\theta_2) - 1.0 \, a_2 \, q \, m_5 \cos(\theta_1) \sin(\theta_2) + 0.5 \, a_3 \, q \, m_3 \cos(\theta_3) \sin(\theta_1) + 1.0 \, a_3 \, q \, m_4 \cos(\theta_3) \sin(\theta_1) + 1.0 \, a_4 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_4 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_4 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_4 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \sin(\theta_3) + 0.0 \, a_5 \, q \, m_5 \cos(\theta_3) \cos(\theta_3)
1.0 \, a_3 \, g \, m_5 \, \cos(\theta_3) \, \sin(\theta_1) - 1.0 \, g \, \log_{2.1} m_2 \, \cos(\theta_1) \, \sin(\theta_2) + 1.0 \, g \, \log_{3.1} m_3 \, \cos(\theta_3) \, \sin(\theta_1) - 1.0 \, g \, \log_{3.2} m_3 \, \sin(\theta_1) \sin(\theta_3) + 1.0 \, \log_{3.2} m_3 \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, \log_{3.2} m_3 \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, \log_{3.2} m_3 \, \sin(\theta_3) + 1.0 \, \log_{3.2} m_3 \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, \log_{3.2} m_3 \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, \log_{3.2} m_3 \, \cos(\theta_3) \, \sin(\theta_3) + 1.0 \, \log_{3.2} m_3 \, \cos(\theta_3) \, 
0.5 \, a_4 \, q \, m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) + 1.0 \, a_4 \, q \, m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) - 1.0 \, q \, \log_2 m_3 \cos(\theta_1) \cos(\theta_3) \sin(\theta_2) + 1.0 \, \log_2 m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) + 1.0 \, \log_2 m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_4) + 1.0 \, \log_2 m_4 \cos(\theta_4) \cos(\theta_4) \sin(\theta_4) + 1.0 \, \log_2 m_4 \cos(\theta_4) \cos(\theta_5) 
1.0 q \log_{4.1} m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) - 0.5 a_3 q m_3 \cos(\theta_1) \sin(\theta_2) \sin(\theta_3) - 1.0 a_3 q m_4 \cos(\theta_1) \sin(\theta_2) \sin(\theta_2) \sin(\theta_3) - 1.0 a_3 q m_4 \cos(\theta_1) \sin(\theta_2) \sin(\theta_2) \sin(\theta_3) - 1.0 a_3 q m_4 \cos(\theta_1) \sin(\theta_2) \sin(\theta_2) \sin(\theta_3) - 1.0 a_3 q m_4 \cos(\theta_1) \sin(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_1) \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_2) \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_2) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(
1.0 \, a_3 \, q \, m_5 \cos(\theta_1) \sin(\theta_2) \sin(\theta_3) - 1.0 \, q \, \mathrm{lc}_{3,1} \, m_3 \cos(\theta_1) \sin(\theta_2) \sin(\theta_3) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_1) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_3) \sin(\theta_4) - 1.0 \, q \, \mathrm{lc}_{4,2} \, m_4 \cos(\theta_4) \cos(\theta_4) + 1.0 \, \mathrm{lc}_{4,2} \, \mathrm{lc}_{4,2}
1.0 g \log_{4.2} m_4 \cos(\theta_4) \sin(\theta_1) \sin(\theta_3) - 0.5 a_4 g m_4 \sin(\theta_1) \sin(\theta_3) \sin(\theta_4) - 1.0 a_4 g m_5 \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) 
1.0 g \log_{4.1} m_4 \sin(\theta_1) \sin(\theta_3) \sin(\theta_4) - 1.0 g \log_{4.2} m_4 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \sin(\theta_2) - 1.0 g \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_1) - 1.0 g \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_1) - 1.0 g \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 1.0 g \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 1.0 g \log_{5.2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 1.0 g \log_{5.2} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) - 1.0 g \log_{5.2} m_5 \cos(\theta_5) \sin(\theta_4) - 1.0 g \log_{5.2} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5
0.5 \, a_4 \, g \, m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 0.5 \, a_4 \, g \, m_4 \cos(\theta_1) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 \, a_4 \, g \, m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 0.5 \, a_4 \, g \, m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 \, a_4 \, g \, m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) - 0.0 \, a_4 \, g \, m_5 \cos(\theta_1) \cos(\theta_2) \sin(\theta_2) \sin(\theta_3) - 0.0 \, a_4 \, g \, m_5 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) - 0.0 \, a_4 \, g \, m_5 \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \cos
1.0 \, a_4 \, g \, m_5 \, \cos(\theta_1) \, \cos(\theta_4) \, \sin(\theta_2) \, \sin(\theta_3) - 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_3) \, \cos(\theta_4) \, \sin(\theta_1) \, \sin(\theta_5) - 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_3) \, \cos(\theta_5) \, \sin(\theta_1) \, \sin(\theta_4) - 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \sin(\theta_5) + 0.5 \, a_5 \, g \, m_5 \, \cos(\theta_5) \, \cos(\theta_
0.5 a_5 q m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_1) \sin(\theta_3) - 1.0 q \log_{11} m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) - 1.0 q \log_{11} m_4 \cos(\theta_1) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) - 1.0 q \log_{11} m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) - 1.0 q \log_{11} m_4 \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos
1.0 g \log_{5.1} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_5) - 1.0 g \log_{5.1} m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_1) \sin(\theta_4) - 1.0 g \log_{5.1} m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_1) \sin(\theta_3) + 1.0 g \log_{5.1} m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5)
1.0 g \log_{4.2} m_4 \cos(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 g \log_{5.2} m_5 \cos(\theta_3) \sin(\theta_1) \sin(\theta_4) \sin(\theta_5) + 1.0 g \log_{5.2} m_5 \cos(\theta_4) \sin(\theta_1) \sin(\theta_3) \sin(\theta_5) + 1.0 g \log_{5.2} m_5 \cos(\theta_4) \sin(\theta_5) + 1.0 g \log_{5.2} m_5 \cos(\theta_4) \sin(\theta_5) + 1.0 g \log_{5.2} m_5 \cos(\theta_5) \cos(
1.0 q \log_{2} 2 m_{5} \cos(\theta_{5}) \sin(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{4}) + 0.5 a_{5} q m_{5} \sin(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{5}) + 1.0 q \log_{1} 2 m_{5} \sin(\theta_{5}) \cos(\theta_{5}) \cos
1.0 g \log_{5.1} m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_2) \sin(\theta_4) \sin(\theta_5) + 1.0 g \log_{5.1} m_5 \cos(\theta_1) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 1.0 g \log_{5.1} m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + 1.0 g \log_{5.1} m_5 \cos(\theta_4) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + 1.0 g \log_{5.1} m_5 \cos(\theta_4) \sin(\theta_5) 
1.0 q \log_{10} m_5 \cos(\theta_1) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 1.0 q \log_{10} m_5 \cos(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 q \log_{10} m_5 \cos(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5)
0.5 a_5 g m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) + 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_5) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta
1.0 q \log_{2} q \log_{5} q \log_{5} \cos(\theta_{1}) \cos(\theta_{3}) \cos(\theta_{4}) \sin(\theta_{2}) \sin(\theta_{5}) + 1.0 q \log_{5} q \log_{5} \cos(\theta_{1}) \cos(\theta_{3}) \cos(\theta_{5}) \sin(\theta_{2}) \sin(\theta_{4}) + 1.0 q \log_{5} q 
1.0 q \log_{2} 2 m_{5} \cos(\theta_{1}) \cos(\theta_{2}) \sin(\theta_{2}) \sin(\theta_{3}) + 0.5 a_{5} q m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \sin(\theta_{2}) \sin(\theta_{4}) \sin(\theta_{5}) +
0.5 a_5 q m_5 \cos(\theta_1) \cos(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) + 0.5 a_5 q m_5 \cos(\theta_1) \cos(\theta_5) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (A54)
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G_{2} = 1.0 g \log_{4,2} m_{4} \cos(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{4}) - 1.0 a_{2} g m_{3} \cos(\theta_{2}) \sin(\theta_{1}) - 1.0 a_{2} g m_{4} \cos(\theta_{2}) \sin(\theta_{1}) - 1.0 a_{1} g m_{4} \cos(\theta_{2}) \sin(\theta_{1}) - 1.0 a_{2} g m_{5} \cos(\theta_{2}) \sin(\theta_{1}) - 1.0 g \log_{2,3} m_{2} \sin(\theta_{1}) \sin(\theta_{2}) - 1.0 g \log_{3,3} m_{3} \sin(\theta_{1}) \sin(\theta_{2}) - 1.0 g \log_{4,3} m_{4} \sin(\theta_{1}) \sin(\theta_{2}) - 1.0 g \log_{5,3} m_{5} \sin(\theta_{1}) \sin(\theta_{2}) - 1.0 g \log_{5,2} m_{5} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1}) - \frac{a_{3} g m_{3} \cos(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{3})}{2} - \frac{1.0 a_{3} g m_{4} \cos(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{3}) - 1.0 a_{3} g m_{5} \cos(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{3}) - \frac{a_{1} g m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1}) \sin(\theta_{3})}{2} - \frac{1.0 g \log_{4,2} m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1}) \sin(\theta_{3}) - \frac{a_{1} g m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1}) \sin(\theta_{3})}{2} - \frac{a_{1} g m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1}) \sin(\theta_{3})}{2} - \frac{a_{1} g m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1}) \sin(\theta_{3}) - \frac{a_{1} g m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1}) \sin(\theta_{3})}{2} - \frac{a_{1} g m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_{1})}{2} - \frac{a_{1} g m_{4} \cos(\theta_{2}) \cos(\theta_{3}) \sin(\theta_
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 $G_3 = g \log_{3.2} m_3 \cos(\theta_1) \cos(\theta_3) + 0.5 a_3 g m_3 \cos(\theta_1) \sin(\theta_3) + a_3 g m_4 \cos(\theta_1) \sin(\theta_3) + a_3 g m_5 \cos(\theta_1) \cos(\theta_1) \cos(\theta_2) + a_3 g m_5 \cos(\theta_1) \cos(\theta_1) \cos(\theta_2) + a_3 g m_5 \cos(\theta_1) \cos(\theta_2) \cos(\theta_1) \cos(\theta_2) \cos(\theta_1) \cos(\theta_2) \cos(\theta_1) \cos(\theta_2) \cos(\theta_2) \cos(\theta_1) \cos(\theta_2) \cos(\theta_2) \cos(\theta_1) \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \cos(\theta_1) \cos(\theta_2) \cos(\theta_2$ $q \log_{1.0} m_3 \cos(\theta_1) \sin(\theta_3) + g \log_{1.0} m_4 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_4) \sin(\theta_3) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \sin(\theta_3) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \cos(\theta_2) \sin(\theta_2) \cos(\theta_2) \cos(\theta_2)$ $a_4 q m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + a_4 q m_5 \cos(\theta_1) \cos(\theta_4) \sin(\theta_3) + g \log_{4.1} m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + g \log_{4.1} m_4 \cos(\theta_1) \cos(\theta_4) \sin(\theta_3) - g \log_{4.1} m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + g \log_{4.1} m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) + g \log_{4.1} m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) \sin(\theta_3) + g \log_{4.1} m_4 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) \cos(\theta_2) \sin(\theta_3) \cos(\theta_3) \sin(\theta_3) + g \log_{4.1} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + g \log_{4.1} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + g \log_{4.1} m_4 \cos(\theta_2) \cos(\theta_3) \sin(\theta_3) + g \log_{4.1} m_4 \cos(\theta_3) \cos(\theta_3) \sin(\theta_3) + g \log_{4.1} m_4 \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_3) \cos(\theta_4) \cos(\theta_3) \cos(\theta_$ $0.5 \, a_3 \, g \, m_3 \, \cos(\theta_3) \, \sin(\theta_1) \, \sin(\theta_2) - 1.0 \, a_3 \, g \, m_4 \, \cos(\theta_3) \, \sin(\theta_1) \, \sin(\theta_2) - 1.0 \, a_3 \, g \, m_5 \, \cos(\theta_3) \, \sin(\theta_1) \, \sin(\theta_2) - 1.0 \, a_3 \, g \, m_4 \, \cos(\theta_3) \, \sin(\theta_3) \, \cos(\theta_3) \, \cos(\theta_3) \, \sin(\theta_3) \, \cos(\theta_3) \, \cos(\theta$ $1.0 g \log_{3.1} m_3 \cos(\theta_3) \sin(\theta_1) \sin(\theta_2) - g \log_{4.2} m_4 \cos(\theta_1) \sin(\theta_3) \sin(\theta_4) + g \log_{3.2} m_3 \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) - g \log_{10} m_3 \cos(\theta_3) \sin(\theta_4) + g \log_{10} m_3 \cos(\theta_3) \sin(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_3) \sin(\theta_4) \sin(\theta_4) \sin(\theta_4) \sin(\theta_5) \sin(\theta_$ $1.0 g \log_{5.2} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 g \log_{5.2} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_5) \sin(\theta_4) - 1.0 g \log_{5.2} m_5 \cos(\theta_1) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) - 1.0 g \log_{5.2} m_5 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) - 1.0 g \log_{5.2} m_5 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 g \log_{5.2} m_5 \cos(\theta_1) \cos(\theta_2) \sin(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \sin(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \sin(\theta_3) \cos(\theta_4) \cos(\theta_4) \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos$ $0.5 \, a_4 \, q \, m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) - 1.0 \, a_4 \, q \, m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) - 0.5 \, a_5 \, q \, m_5 \cos(\theta_5) \cos(\theta_$ $0.5 a_5 q m_5 \cos(\theta_1) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - 0.5 a_5 q m_5 \cos(\theta_1) \cos(\theta_5) \sin(\theta_3) \sin(\theta_4) - 1.0 q \log_{10} \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) - 0.0 \cos(\theta_4) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \cos(\theta_5$ $q \log_{10} \log_{10} \log(\theta_1) \cos(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - q \log_{10} \log(\theta_4) \cos(\theta_4) \sin(\theta_3) \sin(\theta_5) - q \log_{10} \log(\theta_5) \sin(\theta_5) \sin(\theta_$ $q \log_{10} q \log_{10} q$ $0.5 \, a_4 \, q \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, a_4 \, q \, m_5 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \, \sin(\theta_1) \, \sin(\theta_2) \, \sin(\theta_3) \, \sin(\theta_4) + 1.0 \, q \, \log_4 \, m_4 \,$ $0.5 a_5 q m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + q \log_5 1 m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) + q \log_5 1 m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) \sin(\theta_5) + q \log_5 1 m_5 \cos(\theta_4) \cos(\theta_5) + q \log_5 1 m_5 \cos(\theta_5) \cos(\theta_5)$ $q \log_{10} \log_{10$ $q \operatorname{lc}_5 2 m_5 \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_5) - q \operatorname{lc}_5 2 m_5 \cos(\theta_5) \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5 q m_5 \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - q \operatorname{lc}_5 2 m_5 \cos(\theta_5) \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - q \operatorname{lc}_5 2 m_5 \cos(\theta_5) \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5 q m_5 \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - q \operatorname{lc}_5 2 m_5 \cos(\theta_5) \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) - 0.5 a_5 q m_5 \sin(\theta_3) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) - q \operatorname{lc}_5 2 m_5 \cos(\theta_5) \sin(\theta_4) \sin(\theta_5) - q \operatorname{lc}_5 2 m_5 \cos(\theta_5) \cos(\theta_5$ $g \operatorname{lc}_{5,1} m_5 \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_5) + g \operatorname{lc}_{5,2} m_5 \cos(\theta_3) \cos(\theta_4) \cos(\theta_5) \sin(\theta_1) \sin(\theta_2) + 0.5 a_5 g m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) \sin(\theta_5) + 0.5 a_5 g m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) \sin(\theta_5) + 0.5 a_5 g m_5 \cos(\theta_5) \sin(\theta_5) \cos(\theta_5) \sin(\theta_5) \sin(\theta_5$ $0.5 a_5 q m_5 \cos(\theta_3) \cos(\theta_5) \sin(\theta_1) \sin(\theta_2) \sin(\theta_4) + 0.5 a_5 q m_5 \cos(\theta_4) \cos(\theta_5) \sin(\theta_1) \sin(\theta_2) \sin(\theta_3)$ (A56)

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G_4 = 1.0 g \log_{4,2} m_4 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + 0.5 a_4 g m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_3) + 1.0 a_4 g m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + 1.0 a_4 g m_5 \cos(\theta_1) \cos(\theta_4) \sin(\theta_3) + 1.0 g \log_{4,1} m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + 1.0 g \log_{4,2} m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + 1.0 g \log_{4,2} m_4 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + 1.0 g \log_{4,2} m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) + 1.0 g \log_{5,2} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \sin(\theta_5) - 1.0 g \log_{5,2} m_5 \cos(\theta_1) \cos(\theta_3) \cos(\theta_4) \sin(\theta_3) - 1.0 g \log_{5,2} m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_3) - 0.5 a_4 g m_4 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) - 1.0 a_4 g m_5 \cos(\theta_3) \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) - 0.5 a_5 g m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 g m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 0.5 a_5 g m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) \sin(\theta_2) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) \sin(\theta_5) - 1.0 g \log_{5,1} m_5 \cos(\theta_1) \cos(\theta_3) \sin(\theta_4) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) \sin(\theta_2) \sin(\theta_4) + 1.0 g \log_{4,2} m_4 \cos(\theta_4) \sin(\theta_1) \sin(\theta_2) \sin(\theta_3) \sin(\theta_4) + 1.0 g \log_{4,2} m_4 \cos(\theta_4) \sin(\theta_4) + 1.0 g \log_{4,2} m_4 \cos(\theta_4) \sin(\theta_4) + 1.0 g \log_{4,2} m_4 \cos(\theta_4) \cos(\theta_5) \sin(\theta_4) + 1.0 g \log_
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(A57)

 $G_{5} = 1.0 g \log_{5,2} m_{5} \cos(\theta_{1}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - 1.0 g \log_{5,2} m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \cos(\theta_{5}) \sin(\theta_{4}) - 1.0 g \log_{5,2} m_{5} \cos(\theta_{1}) \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{3}) - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5})}{2} - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \sin(\theta_{3}) \sin(\theta_{5})}{2} - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{4})}{2} - 1.0 g \log_{5,1} m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{4})}{2} - 1.0 g \log_{5,1} m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5})}{2} - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{5}) \sin(\theta_{3}) \sin(\theta_{4})}{2} - 1.0 g \log_{5,1} m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \cos(\theta_{4}) \cos(\theta_{5})}{2} \sin(\theta_{4}) \sin(\theta_{5}) - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{3}) \cos(\theta_{4}) \sin(\theta_{5})}{2} - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{5}) \sin(\theta_{4}) \sin(\theta_{5})}{2} - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{5}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - \frac{a_{5} g m_{5} \cos(\theta_{4}) \cos(\theta_{5}) \sin(\theta_{1}) \sin(\theta_{5})}{2} - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{1}) \cos(\theta_{5}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5}) - \frac{a_{5} g m_{5} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3}) \sin(\theta_{4}) \sin(\theta_{5})}{2} - \frac{a_{5} g m_{5} \cos(\theta_{1}) \cos(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{3})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{1})}{2} \sin(\theta_{1}) \sin(\theta_{2}) \sin(\theta_{$