```
Quit[];
SetDirectory[NotebookDirectory[]]
<< HurToolbox.m
D:\Dropbox\TAMU\Group\Project\Walker\seven_link\AbsAngleJointTorque
HurToolbox for modeling and analysis of multibody systems 2.0.0.
HurToolbox mainly uses vector manipulation (vectors, dyadics).
Coordinates and matrix representation of the dyadics are also available.
Available methods: Newton-Euler
   Method, Euler-Lagrange Method, Hamiltonian Method, Kane's Method.
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Email questions, comments, or concerns to pilwonhur@tamu.edu.
(*To use n, i,j,k*)
(*HurInitialize[]*)
(*To use user-defined Newtonian RF and i,j,k*)
HurInitialize[rf0]
(*To use user-defined Newtonian RF and its own x,y,z*)
(*HurInitialize[rf0,"xyz"]*)
HurLoadData["data1.m"]
We have 7 links. If a,b,c,d,e,f,g are used, we have problems with g which is the gravitational acceler-
ation. So, let's use rf1..
HurDefineRF[rf1, rf2, rf3, rf4, rf5, rf6, rf7]
HurDefineGeneralizedCoordinates[q1[t],
 q2[t], q3[t], q4[t], q5[t], q6[t], q7[t], q8[t], q9[t]]
HurDefineDCM[rf1, q1[t], {0, 0, 1}]
HurDefineDCM[rf2, q2[t], {0, 0, 1}]
HurDefineDCM[rf3, q3[t], {0, 0, 1}]
HurDefineDCM[rf4, q4[t], {0, 0, 1}]
HurDefineDCM[rf5, q5[t], {0, 0, 1}]
HurDefineDCM[rf6, q6[t], {0, 0, 1}]
HurDefineDCM[rf7, q7[t], {0, 0, 1}]
ToeST = q8[t] i0 + q9[t] j0;
HeelST = ToeST - (lfa + lfb) i1;
FootSTCOM = ToeST - lfa i1 + lfc j1;
AnkleST = ToeST - lfe i1 + (lfc + lfd) j1;
ShankSTCOM = AnkleST + 1sa j2;
KneeST = AnkleST + (1sa + 1sb) j2;
ThighSTCOM = KneeST + lta j3;
Hip = KneeST + (1ta + 1tb) j3;
TorsoCOM = Hip + 1ba j4;
ThighSWCOM = Hip - 1tb j5;
KneeSW = Hip - (1tb + 1ta) j5;
ShankSWCOM = KneeSW - 1sb j6;
AnkleSW = KneeSW - (1sb + 1sa) j6;
ToeSW = AnkleSW + lfe i7 - (lfc + lfd) j7;
HeelSW = ToeSW - (1fa + 1fb) i7;
FootSWCOM = ToeSW - 1fa i7 + 1fc j7;
```

```
HurDefineCOMPos[rf1, FootSTCOM]
HurDefineCOMPos[rf2, ShankSTCOM]
HurDefineCOMPos[rf3, ThighSTCOM]
HurDefineCOMPos[rf4, TorsoCOM]
HurDefineCOMPos[rf5, ThighSWCOM]
HurDefineCOMPos[rf6, ShankSWCOM]
HurDefineCOMPos[rf7, FootSWCOM]
HurKinematics[]
```

```
HurDefineMass[rf1, mf]
HurDefineMass[rf2, ms]
HurDefineMass[rf3, mt]
HurDefineMass[rf4, mb]
HurDefineMass[rf5, mt]
HurDefineMass[rf6, ms]
HurDefineMass[rf7, mf]
HurDefineInertia[rf1, {0, 0, 0, 0, 0, Ifz}]
HurDefineInertia[rf2, {0, 0, 0, 0, 0, Isz}]
HurDefineInertia[rf3, {0, 0, 0, 0, 0, Itz}]
HurDefineInertia[rf4, {0, 0, 0, 0, 0, 1bz}]
HurDefineInertia[rf5, {0, 0, 0, 0, 0, Itz}]
HurDefineInertia[rf6, {0, 0, 0, 0, 0, Isz}]
HurDefineInertia[rf7, {0, 0, 0, 0, 0, Ifz}]
```

HurDefineVertical[j0]

```
HolonomicConst = Flatten[List[HurUnifyTriadsCoord[ToeST, rf0][[1;; 2]],
           HurUnifyTriadsCoord[HeelST, rf0][[2]], HurUnifyTriadsCoord[HeelSW, rf0][[1;; 2]]]]
HolonomicConstDot = D[HolonomicConst, t]
gcd = D[HurGlobalGeneralizedCoordinates, t];
AConstr = Grad[HolonomicConstDot, gcd];
AConstr // MatrixForm
{q8[t], q9[t], q9[t] - (lfa + lfb) Sin[q1[t]],
    -1fe Cos[q1[t]] - (1fa + 1fb) Cos[q7[t]] + 1fe Cos[q7[t]] + 
        (1fc + 1fd) Sin[q1[t]] - (1sa + 1sb) Sin[q2[t]] - (1ta + 1tb) Sin[q3[t]] +
         (lta + ltb) Sin[q5[t]] + (lsa + lsb) Sin[q6[t]] + (lfc + lfd) Sin[q7[t]],
     (lfc + lfd) Cos[q1[t]] + (lsa + lsb) Cos[q2[t]] + (lta + ltb) Cos[q3[t]] -
         (lta + ltb) Cos[q5[t]] - (lsa + lsb) Cos[q6[t]] - (lfc + lfd) Cos[q7[t]] +
       q9[t] - lfe Sin[q1[t]] - (lfa + lfb) Sin[q7[t]] + lfe Sin[q7[t]]}
\{q8'[t], q9'[t], -(1fa + 1fb) \cos[q1[t]] q1'[t] + q9'[t],
    -(1fc + 1fd) \cos[q1[t]] q1'[t] + 1fe \sin[q1[t]] q1'[t] - (1sa + 1sb) \cos[q2[t]] q2'[t] - (1sa + 1sb)
         (lta + ltb) Cos[q3[t]] q3'[t] + (lta + ltb) Cos[q5[t]] q5'[t] +
         (lsa + lsb) Cos[q6[t]] q6'[t] + (lfc + lfd) Cos[q7[t]] q7'[t] +
         (1fa + 1fb) Sin[q7[t]] q7'[t] - 1fe Sin[q7[t]] q7'[t] + q8'[t],
    -1fe Cos [q1[t]] q1'[t] - (1fc + 1fd) Sin[q1[t]] q1'[t] - (1sa + 1sb) Sin[q2[t]] q2'[t] -
         (lta + ltb) Sin[q3[t]] q3'[t] + (lta + ltb) Sin[q5[t]] q5'[t] +
         (lsa + lsb) Sin[q6[t]] q6'[t] - (lfa + lfb) Cos[q7[t]] q7'[t] +
       lfe Cos [q7[t]] q7'[t] + (lfc + lfd) Sin [q7[t]] q7'[t] + q9'[t]}
                                                                                                                                                                                                                                                            a
                                                                                                                                                                             0
                                                                                                                                                                                                                                                            0
                                                                   0
                                                                                                                                                                             0
                               - (lfa + lfb) Cos[q1[t]]
     -(1fc + 1fd) \cos[q1[t]] + 1fe \sin[q1[t]] - (1sa + 1sb) \cos[q2[t]] - (1ta + 1tb) \cos[q3[t]]
     -1fe Cos[q1[t]] - (1fc + 1fd) Sin[q1[t]] - (1sa + 1sb) Sin[q2[t]] - (1ta + 1tb) Sin[q3[t]]
HurSaveData["data1.m", "HolonomicConst", "AConstr", "ToeST", "HeelST",
    "FootSTCOM", "AnkleST", "ShankSTCOM", "KneeST", "ThighSTCOM", "Hip", "TorsoCOM",
    "ThighSWCOM", "KneeSW", "ShankSWCOM", "AnkleSW", "ToeSW", "HeelSW", "FootSWCOM"]
```



HurGlobalMMatrix // MatrixForm

```
(lsb (mb + mf + ms + 2 mt) + lsa (mb + mf + 2 (ms + mt))) ((lfc + lfd) Cos [q1 [t]])
                             (ltb (mb + mf + ms + mt) + lta (mb + mf + ms + 2 mt)) ((lfc + lfd) Cos[q1[t] - mf + ms + mt))
                                                         lba mb ((lfc + lfd) Cos[q1[t] - q4[t]] - lfe Sin[q1[
                                     -(lta (mf + ms) + ltb (mf + ms + mt)) ((lfc + lfd) Cos[q1[t] - q5[t]
                                             -(\operatorname{lsamf} + \operatorname{lsb}(\operatorname{mf} + \operatorname{ms}))((\operatorname{lfc} + \operatorname{lfd})\operatorname{Cos}[\operatorname{q1}[t] - \operatorname{q6}[t]) - \operatorname{lf}
                              -mf ((lfc lfd + lfd<sup>2</sup> - lfa lfe + lfe<sup>2</sup>) Cos[q1[t] - q7[t]] - (lfa (lfc + lfa))
                     - (lfd (mb + mf + 2 (ms + mt)) + lfc (mb + 2 (mf + ms + mt))) Cos[q1[t]] + (lfa mf +
                     -\left(\texttt{lfa mf} + \texttt{lfe (mb + mf + 2 (ms + mt))}\right) \texttt{Cos[q1[t]]} - \left(\texttt{lfd (mb + mf + 2 (ms + mt))} + \texttt{ms + mt}\right) + \texttt{ms + mt}
```

HurGlobalCMatrix // MatrixForm

```
(lsb (mb + mf + ms + 2 mt) + lsa (mb + mf + 2 (ms + mt))) (-lfe Cos[q1[t] - q2[t]] - (lfc + 1)
                (ltb (mb + mf + ms + mt) + lta (mb + mf + ms + 2 mt)) (-lfe Cos[q1[t] - q3[t]] - (lfc + lfd)
                                                        lba mb (-lfe Cos[q1[t] - q4[t]] - (lfc + lfd) Sin[q1[t] - q4[t]]
                            -\left(\texttt{lta}\,\left(\texttt{mf}+\texttt{ms}\right)\,+\,\texttt{ltb}\,\left(\texttt{mf}+\texttt{ms}+\texttt{mt}\right)\,\right)\,\left(-\,\texttt{lfe}\,\texttt{Cos}\,[\,\texttt{q1}\,[\,\texttt{t}\,]\,-\,\texttt{q5}\,[\,\texttt{t}\,]\,\,]\,-\,\left(\,\texttt{lfc}\,+\,\texttt{lfd}\right)\,\texttt{Sin}\,[\,\texttt{q1}\,]\,
                                       -\left(\operatorname{lsamf} + \operatorname{lsb}\left(\operatorname{mf} + \operatorname{ms}\right)\right)\left(-\operatorname{lfe}\operatorname{Cos}\left[\operatorname{q1}\left[\operatorname{t}\right] - \operatorname{q6}\left[\operatorname{t}\right]\right] - \left(\operatorname{lfc} + \operatorname{lfd}\right)\operatorname{Sin}\left[\operatorname{q1}\left[\operatorname{t}\right]\right]\right)
                 -mf(-(1fa(1fc+1fd)-1fc1fe)Cos[q1[t]-q7[t]]-(1fc1fd+1fd^2-1fa1fe+1fe^2)
 \frac{1}{3} (2 (lfa mf + lfe (mb + mf + 2 (ms + mt))) Cos[q1[t]] + 2 (lfd (mb + mf + 2 (ms + mt)) + lfc (mb + 2)
\frac{1}{2} (-2 (lfd (mb + mf + 2 (ms + mt)) + lfc (mb + 2 (mf + ms + mt))) Cos[q1[t]] + 2 (lfa mf + lfe (mb +
```

HurGlobalGVector // MatrixForm

```
-g ((lfa mf + lfe (mb + mf + 2 (ms + mt))) Cos[q1[t]] + (lfd (mb + mf + 2 (ms + mt)) + lfc (mb + 2 (ms + mt))
                             -g (lsb (mb + mf + ms + 2 mt) + lsa (mb + mf + 2 (ms + mt))) Sin[q2[t]]
                               -g (ltb (mb + mf + ms + mt) + lta (mb + mf + ms + 2 mt)) Sin[q3[t]]
                                                      - g lba mb Sin [q4[t]]
                                       g (lta (mf + ms) + ltb (mf + ms + mt)) Sin[q5[t]]
                                             g (lsamf + lsb (mf + ms)) Sin[q6[t]]
                                       g mf ((-lfa + lfe) Cos[q7[t]] + lfd Sin[q7[t]])
                                                    g(mb + 2(mf + ms + mt))
```

dyn1 = HurGlobalELEquation[[1]]; HurToJulia[dyn1]

```
(tau1 + (lambda3 * lfa * cos (q1) + (lambda3 * lfb * cos (q1) + (lambda4 * lfc * cos (q1) + (lambda4 * lfd * lfd
                                                \cos{(q1)} + (1 \text{ambda5} \times 1 \text{fe} \times \cos{(q1)} + (-1 \times g \times 1 \text{fe} \times \text{mb} \times \cos{(q1)} + (-1 \times g \times 1 \text{fa} \times \text{mf} \times \cos{(q1)} + (-1 \times g \times 1 \text{fe} \times 1 \text
                                                mf*cos(q1) + (-2*g*lfe*ms*cos(q1) + (-2*g*lfe*mt*cos(q1) + (lambda5*lfc*sin(q1) + (lambda
                                                lambda5*lfd*sin(q1) + (-1*lambda4*lfe*sin(q1) + (-1*g*lfc*mb*sin(q1) + (-1*g*lfd*mb*sin(q1) + (-1*g*lfd*mb*sin(q
                                                    (q1) + (-2*g*lfc*mf*sin(q1) + (-1*g*lfd*mf*sin(q1) + (-2*g*lfc*ms*sin(q1) + (-2*g*lfc*ms*sin(q1) + (-2*g*lfd*ms*sin(q1) + (-2*g*lfd*ms*sin(q1) + (-2*g*lfc*ms*sin(q1) + (-2*g*lfd*ms*sin(q1) + (-2*g*lfc*ms*sin(q1) + (-2*g*lfd*ms*sin(q1) + (-2*g*lfc*ms*sin(q1) + (-2*g*lfd*ms*sin(q1) + (-2*g*lfd*ms*
                                                sin\left( q1\right) + \left( -2*g*lfc*mt*sin\left( q1\right) + \left( -2*g*lfd*mt*sin\left( q1\right) + \left( \left( lsb*\left( mb+\left( ms+2*mt\right) \right) \right) \right) + lsa*\left( lsb*\left( mb+\left( ms+2*mt\right) \right) + lsa*\left( lsb*\left( mb+\left( ms+2*mt\right) \right) \right) + lsa*\left( lsb*\left( mb+\left( ms+2*mt\right) \right) + ls
                                                mb + (mf + 2 \star (ms + mt)))) \star (1fe \star cos((q1 + -1 \star q2)) + (1fc + 1fd) \star sin((q1 + -1 \star q2))) \star (q2d)^{(2)} + ((q2d) \star (q2d)) \star (q2d)^{(2)} + ((q2d) \star (q2d))^{(2)} + ((q2d)
                                                \sin((q1+-1*q3))*(q3d)^{(2)}+(1ba*1fe*mb*cos((q1+-1*q4))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb*sin((q1+-1*q4)))*(q4d)^{(2)}+(1ba*1fc*mb
                                                    (q1+-1*q4))*(q4d)^{(2)}+(1ba*1fd*mb*sin((q1+-1*q4))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*1fe*1ta*mf*cos((q1+-1*q4)))*(q4d)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+(-1*q4)^{(2)}+
                                                q1+-1*q5)) * (q5d)^{(2)}+(-1*1fe*1tb*mf*cos((q1+-1*q5))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*1fe*1ta*ms*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)}+(-1*q5)^{(2)
                                                    (q1+-1*q5))*(q5d)^{(2)}+(-1*lfe*ltb*ms*cos((q1+-1*q5))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q1+-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q1+-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q1+-1*lfe*ltb*mt*cos((q1+-1*q5)))*(q1+-1*lfe*ltb*mt*cos((q1+-1*q5)))*(
                                                    ((q1+-1*q5))*(q5d)^{(2)}+(-1*lfc*lta*mf*sin((q1+-1*q5))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*lta*mf*sin((q1+-1*q5)))*(q5d)^{(
                                                \sin((q1+-1*q5))*(q5d)^{(2)}+(-1*lfc*ltb*mf*sin((q1+-1*q5))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*mf*sin((q1+-1*q5)))*(q5d)^{
                                                    *\sin((q1+-1*q5))*(q5d)^(2)+(-1*lfc*lta*ms*sin((q1+-1*q5))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*lfd*lta*ms*sin((q1+-1*q5)))*(q5d)^(2)+(-1*
                                                ms*sin((q1+-1*q5))*(q5d)^{(2)}+(-1*lfc*ltb*ms*sin((q1+-1*q5))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q5d)^{(2)}+(-1*lfd*ltb*ms*sin((q1+-1*q5)))*(q
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 $*ms*sin((q1+-1*q5))*(q5d)^(2)+(-1*lfc*ltb*mt*sin((q1+-1*q5))*(q5d)^(2)+(-1*lfd*mt*sin((q1+-1*q5)))*(q5d)^($ $ltb*mt*sin((q1+-1*q5))*(q5d)^(2)+(-1*lfe*lsa*mf*cos((q1+-1*q6))*(q6d)^(2)+(-1*lfe*lsa*mf*cos((q1+-1*q6)))*(q6d)^$ $*1sb*mf*cos((q1+-1*q6))*(q6d)^(2)+(-1*1fe*1sb*ms*cos((q1+-1*q6))*(q6d)^(2)+(-1*q6))*(q6d)^(2)+(-1*q6)$ $1 fc * 1sa * mf * sin ((q1 + -1 * q6)) * (q6d) ^ (2) + (-1 * 1fd * 1sa * mf * sin ((q1 + -1 * q6)) * (q6d) ^ (2) + (-1 * 1fd * 1sa * mf * sin ((q1 + -1 * q6))) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) * (q6d) ^ (2) + (-1 * 1fd * q6)) * (q6d) * (q6$ $*lfc * lsb * mf * sin((q1 + -1 * q6)) * (q6d) ^ (2) + (-1 * lfd * lsb * mf * sin((q1 + -1 * q6)) * (q6d) ^ (2) + (-1 * lfd * lsb * mf * sin((q1 + -1 * q6))) * (q6d) ^ (2) + (-1 * lfd * lsb * lsb * mf * sin((q1 + -1 * q6))) * (q6d) ^ (2) + (-1 * lfd * lsb * lsb * lsb * mf * sin((q1 + -1 * q6))) * (q6d) ^ (2) + (-1 * lsb *$
$-1*lfc*lsb*ms*sin((q1+-1*q6))*(q6d)^(2)+(-1*lfd*lsb*ms*sin((q1+-1*q6))*(q6d)^(2)+(-1*lfd*lsb*ms*sin((q1+-1*q6)))*(q6d)^(2)+(-1*lfd*ms*sin((q1+-1*q6)))*(q6d)^(2)+(-1*lfd*ms*sin((q1+-1*q6)))*(q6d)^($ $(-1*1fa*1fc*mf*cos((q1+-1*q7))*(q7d)^(2)+(-1*1fa*1fd*mf*cos((q1+-1*q7))*(q7d)^(2)$ $+(1fc*1fe*mf*cos((q1+-1*q7))*(q7d)^(2)+(-1*1fc*1fd*mf*sin((q1+-1*q7))*(q7d)^(2)+(-1*1fc*1fd*mf*sin((q1+-1*q7))*(q7d)^(2)+(-1*1fc*1fd*mf*sin((q1+-1*q7))*(q7d)^(2)+(-1*1fc*1fd*mf*sin((q1+-1*q7)))*(q$ $(-1 * (1fd) ^(2) * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * 1fe * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) ^(2)) + (1fa * mf * sin ((q1 + -1 * q7)) * (q7d) * (q7d) ^(2)) + (q7d) * (q7d) ^(2)) + (q7d) * (q7d) * (q7d) * (q7d) * ($ $+ (-1*(1fe)^{(2)}*mf*sin((q1+-1*q7))*(q7d)^{(2)} + (Ifz*q1dd+((1fc)^{(2)}*mb*q1dd+(2*1fc*)) + (1fz*q1dd+(1fc)^{(2)}*mb*q1dd+(1fc)^{(2)}*mb*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q7)) + (1fz*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q7)) + (1fz*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q7)) + (1fz*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q7)) + (1fz*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q7)) + (1fz*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q7)) + (1fz*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q7)) + (1fz*q1dd+(1fc)^{(2)}*mf*sin((q1+-1*q1)) + (1fz*q1dd+(1fc)^{($ $1fd*mb*q1dd+((1fd)^{(2)}*mb*q1dd+((1fe)^{(2)}*mb*q1dd+((1fa)^{(2)}*mf*q1dd+(2*(1fc)^{(2)})$ $*mf*q1dd+(2*1fc*1fd*mf*q1dd+((1fd)^(2)*mf*q1dd+((1fe)^(2)*mf*q1dd+(2*(1fc)^(2)*ms))$ $*q1dd + (4*1fc*1fd*ms*q1dd + (2*(1fd)^(2)*ms*q1dd + (2*(1fe)^(2)*ms*q1dd + (2*(1fc)^(2)*ms*q1dd + (2*(1fc)^(2)*q1d) + (2*(1fc)^(2)*q1d) + (2*(1fc)^(2)*q1d) + (2*(1fc)^(2)*q1d) + (2*(1fc)^(2)^(2)*q1d) + (2$ $mt*q1dd+(4*lfc*lfd*mt*q1dd+(2*(lfd)^(2)*mt*q1dd+(2*(lfe)^(2)*mt*q1dd+(1fc*lsa*mb*)$ $\cos \left(\, (q1+-1*q2) \, \right) *q2dd + \left(1fd*1sa*mb*cos \left(\, (q1+-1*q2) \, \right) *q2dd + \left(1fc*1sb*mb*cos \left(\, (q1+-1*q2) \, \right) + (q1+-1*q2) \, \right) + (q1+-1*q2) + (q1+-1*q2$ *q2dd + (1fd * 1sb * mb * cos ((q1 + -1 * q2)) * q2dd + (1fc * 1sa * mf * cos ((q1 + -1 * q2)) * q2dd + (1fd * 1sa * mf * cos ((q1 + -1 * q2)) * q2dd + (1fd * 1sa * mf * cos ((q1 + -1 * q2))) * q2dd + (1fd * cos ((q1 + -1 * q2))) * $\mathsf{mf} \star \mathsf{cos} \left(\, (\mathsf{q1} + -1 \star \mathsf{q2}) \, \right) \, \star \mathsf{q2dd} + \left(\mathsf{1fc} \star \mathsf{1sb} \star \mathsf{mf} \star \mathsf{cos} \left(\, (\mathsf{q1} + -1 \star \mathsf{q2}) \, \right) \, \star \mathsf{q2dd} + \left(\mathsf{1fd} \star \mathsf{1sb} \star \mathsf{mf} \star \mathsf{cos} \left(\, (\mathsf{q1} + -1 \star \mathsf{q2}) \, \right) \, \star \mathsf{q2dd} \right) \, + \, \mathsf{q2dd} + \, \mathsf{q$ q2)) *q2dd + (2*1fc*lsa*ms*cos((q1+-1*q2))*q2dd +
(2*1fd*lsa*ms*cos((q1+-1*q2))*q2dd + (2*1fd*lsa*ms*cos((q1+-1*q2))*q2dd + (2*1fd*lsa*ms*cos((q1+-1*q2)))*q2dd + (2*1fd*lsa*ms*cos(($1 \\ fc * 1sb * ms * cos ((q1 + -1 * q2)) * q2dd + (1fd * 1sb * ms * cos ((q1 + -1 * q2)) * q2dd + (2 * 1fc * 1sa * mt * 1sa *$ $\cos((q1+-1*q2))*q2dd+(2*1fd*1sa*mt*cos((q1+-1*q2))*q2dd+(2*1fc*1sb*mt*cos((q1+-1*q2)))*q2dd+(q1+-1*q2))*q2dd+(q1+-1*q2))*q2dd+(q1+-1*q2))*q2dd+(q1+-1*q2)*q2dd+(q1+-1*q2))*q2dd+(q1+-1*q2)*q2d$ q2)) * q2dd + (2*lfd*lsb*mt*cos((q1+-1*q2))*q2dd + (-1*lfe*lsa*mb*sin((q1+-1*q2))*q2dd + (-1*lfe*lsa*mb*sin((q1+-1*q2)))*q2dd + (-(-1*lfe*lsb*mb*sin((q1+-1*q2))*q2dd+(-1*lfe*lsa*mf*sin((q1+-1*q2))*q2dd+(-1*lfe*lsa*mf*sin((q1+-1*q2)))*q2dd+(-1*lfe*lsa1 sb * mf * sin ((q1 + -1 * q2)) * q2dd + (-2 * 1 fe * 1 sa * ms * sin ((q1 + -1 * q2)) * q2dd + (-1 * 1 fe * 1 sb * ms * sin ((q1 + -1 $\sin((q1+-1*q2))*q2dd+(-2*lfe*lsa*mt*sin((q1+-1*q2))*q2dd+(-2*lfe*lsb*mt*sin((q1+-1*q2))*q2dd+(-2*lfe*lsb*mt*sin((q1+-1*q2))*q2dd+(-2*lfe*lsb*mt*sin((q1+-1*q2))*q2dd+(-2*lfe*lsb*mt*sin((q1+-1*q2))*q2dd+(-2*lfe*lsb*mt*sin((q1+-1*q2))*q2dd+(-2*lfe*lsb*mt*sin((q1+-1*q2)))*q$
1*q2))*q2dd+(1fc*1ta*mb*cos((q1+-1*q3))*q3dd+(1fd*1ta*mb*cos((q1+-1*q3))*q3dd+(1fd*1ta*mb*cos((q1+-1*q3)))*q3dd*(1fd*1ta*mb*cos((q1+-1*q3)))*q3dd*(1fd*1ta*mb*cos((q1+-1*q3)))(q1+-1*q3))*q3dd+(1fd*1ta*mf*cos((q1+-1*q3))*q3dd+(1fc*1tb*mf*cos((q1+-1*q3))*q3dd+(1fc*1tb*mf*cos((q1+-1*q3)))*q3dd+(1fd*1ta*mf*cos((q1+-1*q3dd + (1fd*1tb*mf*cos((q1+-1*q3))*q3dd + (1fc*1ta*ms*cos((q1+-1*q3))*q3dd + (1fd*1ta*ms*cos((q1+-1*q3)))*q3dd + (1fd*1ta*ms*cos((q1+-1*ms * cos((q1 + -1 * q3)) * q3dd + (lfc * ltb * ms * cos((q1 + -1 * q3)) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3)) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3)) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3)) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd + (lfd * ltb * ms * cos((q1 + -1 * q3))) * q3dd * (lfd * ltb * ltb * ms * cos((q1 + -1 * q3))) * q3dd * (lfd * ltb * ltb * ms * cos((q1 + -1 * q3))) * q3dd * (lfd * ltb * ltq3)) *q3dd + (2*1fc*1ta*mt*cos((q1+-1*q3))*q3dd + (2*1fd*1ta*mt*cos((q1+-1*q3))*q3dd + (2*1fd*1ta*mt*cos((q1+-1*q3))*q3dd + (2*1fd*1ta*mt*cos((q1+-1*q3))*q3dd + (2*1fd*1ta*mt*cos((q1+-1*q3)))*q3dd + (2*1fd*1ta*mt*cos((q1 fc * 1 tb * mt * cos ((q1 + -1 * q3)) * q3dd + (1 fd * 1 tb * mt * cos ((q1 + -1 * q3)) * q3dd + (-1 * 1 fe * 1 ta * mb * 1 ta * m $sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*ltb*mb*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, \left(\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, (\, -1*lfe*lta*mf*sin\left(\, \left(\, q1+-1*q3 \right) \, \right) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin(\, \left(\, q1+-1*q3 \right) \,) \, *q3dd + \, (\, -1*lfe*lta*mf*sin($ 1*q3) *q3dd+(-1*lfe*ltb*mf*sin((q1+-1*q3))*q3dd+(-1*lfe*lta*ms*sin((q1+-1*q3))*q3dd + (-1*1fe*1tb*ms*sin((q1+-1*q3))*q3dd + (-2*1fe*1ta*mt*sin((q1+-1*q3))*q3dd + (-1*1fe*1ta*mt*sin((q1+-1*q3))*q3dd + (-1*1fe*1ta*mt*sin((q1+-1*q3)))*q3dd + (-1*1fe*1ta*1 fe * 1 tb * mt * sin((q1 + -1 * q3)) * q3dd + (1ba * 1 fc * mb * cos((q1 + -1 * q4)) * q4dd + (1ba * 1 fd * mb * cos((q1 + -1 * q4))) * q4dd + (1ba * 1 fd * mb * cos((q1 + -1 * q4))) * q4dd + (1ba * 1 fd * mb * cos((q1 + -1 * q4))) * q4dd + (1ba * 1 fd * mb * cos((q1 + -1 * q4))) * q4dd + (1ba * 1 fd * mb * cos((q1 + -1 * q4))) * q4dd +
(1ba * 1 fd * mb * cos((q1 + -1 * q4))) * q4dd + (1ba * cos((q1 + -1 * q4))) * q4dd + (1ba * cos((q1 + -1 * q4))) * q4dd + (1ba * cos((q1 + -1 * q4))) * q4dd + (1ba * cos((q1 + -1 * q4(q1+-1*q4))*q4dd+(-1*lba*lfe*mb*sin((q1+-1*q4))*q4dd+(-1*lfc*lta*mf*cos((q1+-1*q5))*q4dd+(-1*lfc*lta $)\) \ *q5dd + (-1*lfd*lta*mf*cos((q1+-1*q5))*q5dd + (-1*lfc*ltb*mf*cos((q1+-1*q5))*q5dd + (-1*lfc*ltb*mf*cos((q1+-1*q5)))*q5dd + (-1$ -1*1fd*1tb*mf*cos((q1+-1*q5))*q5dd+(-1*1fc*1ta*ms*cos((q1+-1*q5))*q5dd+(-1*1fd*mf*cos((q1+-1*q5)))*q5dd+(-1*q5))*q5dd+(-1*q5)*q5d+(-1*q5)*q5d+(-1*q5)*q5d+(-1*q5)*q5d+(-1*q5)*q5d+(-1*q5)*q5d+(-1*q5)*q5d+(-1*q5)*q5d+(-1*q5)*q5d+(-1 $\cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fc} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{fd} \star 1 \mathsf{tb} \star \mathsf{mt} \star \cos \left(\, \left(\, \mathsf{q1} + -1 \star \mathsf{q5} \right) \, \right) \, \star \, \mathsf{q5dd} + \left(\, -1 \star 1 \mathsf{q5d} \right) \, \mathsf{q5dd} + \left(\,$
1*q5))*q5dd+(1fe*lta*mf*sin((q1+-1*q5))*q5dd+(1fe*ltb*mf*sin((q1+-1*q5))*q5dd+(1fe*ltb*mf*sin((q1+-1*q5))*q5dd+(1fe*lta*mf*sin((q1+-1*q5))*q5dd+(1fe*lta*mf*sin((q1+-1*q5)))*qlfe*lta*ms*sin((q1+-1*q5))*q5dd+(lfe*ltb*ms*sin((q1+-1*q5))*q5dd+(lfe*ltb*mt*sin((q1+-1*q5)))*q5dd+(lfe*lt(q1+-1*q5))*q5dd+(-1*lfc*lsa*mf*cos((q1+-1*q6))*q6dd+(-1*lfd*lsa*mf*cos((q1+-1*q6)))*q6dd+(-1*q6))*q6dd+(-1*lfd*lsa*mf*cos((q1+-1*q6))*q6dd+(-1*q6))*q6dd+(-1*q6))*q6dd+(-1*q6)*q6dd+(-1*q6)*q6dd+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*q6)*q6d+(-1*))*q6dd+(-1*1fc*1sb*mf*cos((q1+-1*q6))*q6dd+(-1*1fd*1sb*mf*cos((q1+-1*q6))*q6dd+(-1*1fd*1sb*mf*cos((q1+-1*q6))*q6dd+(-1*1fd*1sb*mf*cos((q1+-1*q6)))*q6dd+(-1*q6))*q6d((q1+-1-1*lfc*lsb*ms*cos((q1+-1*q6))*q6dd+(-1*lfd*lsb*ms*cos((q1+-1*q6))*q6dd+(lfe*lsa*ms*cos((q1+-1*q6)))*q6dd+(lfe*lsa*ms*cos((q1
+-1*q6)))*q6dd+(lfe*lsa*ms*cos((q1+-1*q6)))*q6dd+(lfe*lsa*ms*cos((q1+-1*q6)))*q6dd+(lfe*lsa*ms*cos((q1+-1*q6)))*q6dd+(lfe*lsa*ms*cos((q1+-1*q6)))*q6dd+(lfe*lsa*ms*cos((q1+-1*q6)))*q6d+(lfe*lsa*ms*cos((q1+-1*q6)))*q6d+(lfmf*sin((q1+-1*q6))*q6dd+(1fe*lsb*mf*sin((q1+-1*q6))*q6dd+(1fe*lsb*ms*sin((q1+-1*q6)))*q6d+(1fe*lsb*ms*sin((q1+-1*q6)))*q6d+(1fe*lsb*ms*sin((q1+-1*q6)))*q6d+(1fe*lsb*ms*sin((q $q6)) *q6dd + (-1*1fc*1fd*mf*cos((q1+-1*q7))*q7dd + (-1*(1fd)^{(2)}*mf*cos((q1+-1*q7)))*mf*cos((q1+-1*q7))*mf*cos((q1+-1*q7)))*mf*cos((q1+-1*q7))*mf*cos((q1+-1*q7)))*mf*cos($ $q7dd + (1fa * 1fe * mf * cos ((q1 + -1 * q7)) * q7dd + (-1 * (1fe) ^ (2) * mf * cos ((q1 + -1 * q7)) * q7dd + (1fa * (1$ 1 fc * mf * sin ((q1 + -1 * q7)) * q7dd + (1 fa * 1 fd * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1 * 1 fc * 1 fe * mf * sin ((q1 + -1 * q7)) * q7dd + (-1
*q1+-1*q7))*q7dd+(-1*1fc*mb*cos(q1)*q8dd+(-1*1fd*mb*cos(q1)*q8dd+(-2*1fc*mf*cos(q1)*q8d+(-2*1fc*mf*cos(q1)*q8d+(-2*1fc*mf*cos(q1)*q8d+(-2*1fc*mf*cos(q1)*q8d+(-2*1fc*mf*cos(q)*q8dd+(-1*1fd*mf*cos(q1)*q8dd+(-2*1fc*ms*cos(q1)*q8dd+(-2*1fd*ms*cos(q1)*q8d+(-2*1fd*ms*cos(q1)*q8d+(-2*1fd*ms*cos(q1)*q8d+(-2*1fd*ms*cos(q1)*q8d+(-2*1fd*ms*cos(q1)*q8d+(-2*lfc*mt*cos(q1)*q8dd+(-2*lfd*mt*cos(q1)*q8dd+(lfe*mb*sin(q1)*q8dd+(lfa*mf*sin(q1)*q8dd+(lf)*q8dd+(1fe*mf*sin(q1)*q8dd+(2*lfe*ms*sin(q1)*q8dd+(2*lfe*mt*sin(q1)*q8dd+(-1*lfe*mt*sin(q1)*q8dd+(-*mb*cos(q1)*q9dd+(-1*lfa*mf*cos(q1)*q9dd+(-1*lfe*mf*cos(q1)*q9dd+(-2*lfe*ms*cos(q1)*q9dd+(-2*lf
e*ms*cos(q1)*q9dd+(-2*lfe*ms*cos(q1)*q9dd+(-2*lfe*ms*cos(q1)*q9dd+(-2*lfe*ms*cos(q1)*q9dd+(-2*lfe*ms*cos(q1)*q9d+(-2*lfe*ms*cos(q1)*q9d+(-2*lfe*ms*cos(q1)*q9d+(-2*lfe*ms*cos(q1)*q9d+(-2*lfe*ms*cos(q1)*q9d+(-2*lfe*ms*cos(qq1)*q9dd+(-2*lfe*mt*cos(q1)*q9dd+(-1*lfc*mb*sin(q1)*q9dd+(-1*lfd*mb*sin(q1)*q0d+(-1*lfd*mb*sin(q1)*q0d+(-1*lfd*mb*sin(q1)*q0d+(-1*lfd*mb*sin(q1)*q0d+(-1*lfd*mb*sin(q1)*q0d+(-1*lfd*mb*sin(q1)*q0d+(-1*lfd*mb*sin(q1)*q0d+(-1*lfd*mb*sin(q1)*q0d+(-1

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(-2 * lfc * mf * sin (q1) * q9dd + (-1 * lfd * mf * sin (q1) * q9dd + (-2 * lfc * ms * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf * sin (q1) * q9dd + (-2 * lfd * mf
)))))))))))))
```

dyn2 = HurGlobalELEquation[[2]]; HurToJulia[dyn2]

(-1*tau1+(tau2+(lambda4*lsa*cos(q2)+(lambda4*lsb*cos(q2)+(lambda5*lsa*sin(q2)+(lambda5*lsa*lambda5*lsb*sin(q2) + (-1*g*lsa*mb*sin(q2) + (-1*g*lsb*mb*sin(q2) + (-1*g*lsa*mf*sin(q2) + (-1*g*lsa*mf*sin(q2)) + (-1 * g * lsb * mf * sin (q2) + (-2 * g * lsa * ms * sin (q2) + (-1 * g * lsb * ms * sin (q2) + (-2 * g * lsa * mt * sin (q2) + (-1 * g * lsb * ms * sin (q2) + (-1 * g * lsa * mt * sin(q2) + (-2*g*lsb*mt*sin(q2) + (-1*(lsb*(mb+(mf+(ms+2*mt))) + lsa*(mb+(mf+2*(ms+mt)))) * lsa*(mb+(mf+2*(ms+mt))) + lsa*(mb+(ms+2*(ms+mt))) + lsa*(mb+(ms+2*(ms+mt))) + lsa*(mb+(ms+2*(ms+mt))) + lsa*(mb+(ms+2*(ms+mt))) + lsa*(mb+(ms+2*(ms+2*(ms+mt)))) + lsa*(mb+(ms+2*(ms+2*(ms+mt)))) + lsa*(mb+(ms+2*(ms+2*(ms+mt)))) + lsa*(mb+(ms+2*(ms+2*(ms+mt)))) + lsa*(mb+(ms+2*(ms+mt))) + lsa*(mb+(ms+2*(ms+mt))) + lsa*(ms+2*(ms+mt)) + lsa*(ms+(ms+2*(ms+mt))) + lsa*(ms+(ms+mt)) + lsa*(ms+(ms+ $(1fe * cos((q1+-1*q2)) + (1fc+1fd) * sin((q1+-1*q2))) * (q1d)^{(2)} + ((1sa+1sb) * (1tb*(mb+(1sa+1sb))) * (1tb*(mb+(1sa+1sb)) * (1tb*(mb+(1sa+1sb))) * (1tb*(m$ $mf + (ms + mt)) + lta * (mb + (mf + (ms + 2 * mt)))) * sin((q2 + -1 * q3)) * (q3d)^(2) + (lba * lsa * mb * sin((q2 + -1 * q3))) * (q3d)^(2) + (lba * lsa * mb * sin((q3 + (lba * lsa * mb * lsa * mb * sin((q3 + (lba * lsa * mb * lsa * mb * lsa * mb * sin((q3 + (lba * lsa * mb * lsa * m$ $(q2+-1*q4))*(q4d)^{(2)}+(1ba*1sb*mb*sin((q2+-1*q4))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*1sa*1ta*mf*sin((q2+-1*q4)))*(q4d)^{(2)}+(-1*q4)^{(2)}+($ q2+-1*q5)) * $(q5d)^{(2)}+(-1*lsb*lta*mf*sin((q2+-1*q5))*(q5d)^{(2)}+(-1*lsa*ltb*mf*sin((q2+-1*q5)))*(q5d)^$
$(q2+-1*q5))*(q5d)^(2)+(-1*lsb*ltb*mf*sin((q2+-1*q5))*(q5d)^(2)+(-1*lsa*lta*ms*sin((q2+-1*q5)))*(q5d)^(2)+(-1*lsa$ $(\ (q2+-1*q5)\)*(q5d)^{\ }(2)+(-1*lsb*lta*ms*sin((q2+-1*q5))*(q5d)^{\ }(2)+(-1*lsa*ltb*ms*sin((q2+-1*q5))*(q5d)^{\ }(2)+(-1*lsa*ltb*ms*sin((q2+-1*q5))*(q5d)^{\ }(2)+(-1*lsa*ltb*ms*sin((q5d))^{\ }(2)+(-1*lsa*$ $sin((q2+-1*q5))*(q5d)^{(2)}+(-1*lsb*ltb*ms*sin((q2+-1*q5))*(q5d)^{(2)}+(-1*lsa*ltb*mt)$ $* \sin ((q2 + -1 * q5)) * (q5d)^{(2)} + (-1 * 1sb * 1tb * mt * sin ((q2 + -1 * q5)) * (q5d)^{(2)} + (-1 * (1sa)^{(2)} + (-1$) $*mf*sin((q2+-1*q6))*(q6d)^(2)+(-2*lsa*lsb*mf*sin((q2+-1*q6))*(q6d)^(2)+(-1*(lsb))*(q6d)^($ $) ^{(2)} *mf * sin((q2 + -1 * q6)) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6)) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6)) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6)) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsb *ms * sin((q2 + -1 * q6))) * (q6d) ^{(2)} + (-1 * lsa * lsa$ $(1sb)^{(2)}*ms*sin((q2+-1*q6))*(q6d)^{(2)}+(-1*1fa*1sa*mf*cos((q2+-1*q7))*(q7d)^{(2)}+(-1*1fa*1sa*mf*cos((q2+-1*q7))*(q7d)^{(2)}+(-1*1fa*1sa*mf*cos((q2+-1*q7))*(q7d)^{(2)}+(-1*1fa*1sa*mf*cos((q2+-1*q7))*(q7d)^{(2)}+(-1*1fa*1sa*mf*cos((q2+-1*q7)))*(q7d)^{(2)}+(-1*1fa*1sa*mf*cos((q2+-1$ $(1fe * 1sa * mf * cos ((q2+-1*q7)) * (q7d)^(2) + (-1*1fa * 1sb * mf * cos ((q2+-1*q7)) * (q7d)^(2) + (-1*q7) * (q7d)^(2) + (-1*q7)$ $1 fe * 1 sb * mf * cos ((q2 + -1 * q7)) * (q7d) ^ (2) + (-1 * 1 fd * 1 sa * mf * sin ((q2 + -1 * q7)) * (q7d) ^ (2) + (-1 * q7)) *
(q7d) ^ (2) + (-1 * q7)) * (q7d) ^ (2) + (-1 * q7)) * (q7d) ^ (2) + (-1 * q7)) * (q7d) ^ (2) + (-1 * q7)) * (q7d) ^ (2) + (-1 * q7)) * (q7d$ $*1fd*1sb*mf*sin((q2+-1*q7))*(q7d)^(2)+(1fc*1sa*mb*cos((q1+-1*q2))*q1dd+(1fd*1sa*mb*cos((q1+-1*q2)))*(q7d)*(q7d)^(2)+(1fc*1sa*mb*cos((q1+-1*q2)))*(q7d)*(q7d)^(2)+(1fc*1sa*mb*cos((q1+-1*q2)))*(q7d)^(2)+(q1+-1*q2)^(2)+(q1+-1*q2)^(2)+(q1+-1*q2)^(2)+(q1+-1*q2)^(2)+(q1+-1*q2)^(2)+(q1+-1*q2)^(2)$ $mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fc * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos\left(\, (q1 + -1 * q2) \, \right) * q1dd + (1fd * 1sb * mb * cos$ q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fd *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *lsa *mf *cos ((q1 + -1 *q2)) *q1dd + (1fc *mf *cos ((q1 + -1 *q2)q1+-1*q2)) *q1dd+(2*1fd*1sa*ms*cos((q1+-1*q2))*q1dd+(1fc*1sb*ms*cos((q1+-1*q2))*q1dd+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1fc*1sb*ms*cos((q1+-1*q2)))*q1d+(1f $q1dd + (1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fc \star 1sa \star mt \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd
\star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star cos \left(\ (q1 + -1 \star q2) \ \right) \\ \star q1dd + (2 \star 1fd \star 1sb \star ms \star co$
1sa*mt*cos((q1+-1*q2))*q1dd+(2*1fc*1sb*mt*cos((q1+-1*q2))*q1dd+(2*1fd*1sb*mt*cos((q1+-1*q2)))*q1dd+(q1+-1*q2))*q1dd+(q1+-1*q2))*q1dd+(q1+-1*q2))*q1dd+(q1+-1*q2)*q1d+(q1+-1*q2)(q1+-1*q2))*q1dd+(-1*lfe*lsa*mb*sin((q1+-1*q2))*q1dd+(-1*lfe*lsb*mb*sin((q1+-1*q2))))*q1dd+(-1*lfe*lsa*mf*sin((q1+-1*q2))*q1dd+(-1*lfe*lsb*mf*sin((q1+-1*q2))*q1dd+(-1*lfe*lsb*mf*sin((q1+-1*q2))*q1dd+(-1*lfe*lsb*mf*sin((q1+-1*q2)))*q1dd+(-1*q2))*q1dd+(-1*q2)*q1dd+(-1*q2)*q1dd+(-1*q2)*q1d+(-1*q2)*q1d+(-1*q2)*q1d+(-1*q2)*q1d+(-1*q2)*q1d+(-1*q2)*q1d+(-1-2*lfe*lsa*ms*sin((q1+-1*q2))*q1dd+(-1*lfe*lsb*ms*sin((q1+-1*q2))*q1dd+(-2*lfe*lsb*ms*sin((q1+-1*q2)))*q1dd+(-2*lfe*lsb*ms*sin((q1+-1*q2)))*q1dd+(-2*lfe*lsb*ms*sin((q1+-1*q2)))*q1dd+(-1*q2))*q1dd+(-1*lfe*lsb*ms*sin((q1+-1*q2))*q1dd+(-1*lfe*lsb*ms*sin((q1+-1*q2))*q1dd+(-1*lfe*lsb*ms*sin((q1+-1*q2)))*q1d+(-1*lfe*lsb*ms*sin((q1+-1*q2)))*q1d+(-1*lfe*lsb*ms*sin((q1+-1*q2)))*q1d+(-1 $(2)
*mb*q2dd+(2*lsa*lsb*mb*q2dd+((lsb)^(2)*mb*q2dd+((lsa)^(2)*mf*q2dd+(2*lsa*lsb*mb*q2dd+((lsa)^(2)*mf*q2d+((lsa)^(2)*mf*q2d)+((lsa)^(2)*mf*q2d)+((lsa)^(2)*mf*q2d+((lsa)^(2)*mf*q2d)+$ $\mathsf{mf} \star \mathsf{q2dd} + (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{mf} \star \mathsf{q2dd} + \ (2\star (1\mathsf{sa})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (2\star 1\mathsf{sa} \star 1\mathsf{sb} \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} \star \mathsf{q2dd} + \ (\ (1\mathsf{sb})\ ^{\wedge}(2)\ \star \mathsf{ms} + \ (\ (1\mathsf{sb})\) + \ (\ (1\mathsf{sb})\)$ $q2dd + (2*(1sa)^{(2)}*mt*q2dd + (4*1sa*1sb*mt*q2dd + (2*(1sb)^{(2)}*mt*q2dd + (1sa*1ta*mb*cosata) + (2*(1sb)^{(2)}*mt*q2dd + (2*(1sb)^{(2)}*mt*$ $(\;(q2+-1*q3)\;)*q3dd+(1sb*1ta*mb*cos\,(\;(q2+-1*q3)\;)*q3dd+(1sa*1tb*mb*cos\,(\;(q2+-1*q3)\;)*q3dd+(1sa*1tb*mb*cos))*q3dd+(1sa*1tb*mb*cos)$ q3dd + (1sb*1tb*mb*cos((q2+-1*q3))*q3dd + (1sa*1ta*mf*cos((q2+-1*q3))*q3dd + (1sb*1ta*mf*cos((q2+-1*q3)))*q3dd + (1sb*1ta*mf*cos((q2+-1* $\mathsf{mf} \star cos\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsa} \star \mathsf{ltb} \star \mathsf{mf} \star cos\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star cos\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{cos}\left(\, (\mathsf{q2} + -1 \star \mathsf{q3}) \, \right) \, \star \mathsf{q3dd} + \, (\mathsf{lsb} \star \mathsf{ltb} \star \mathsf{mf} \star \mathsf{ltb} \star \mathsf{ltb} \star \mathsf{ltb} \star \mathsf{ltb} \star \mathsf{ltb} + \, \mathsf{ltb} \star \mathsf{ltb} \star \mathsf{ltb} \star \mathsf{ltb} + \, \mathsf{l$ q3)) *q3dd + (1sa*1ta*ms*cos((q2+-1*q3))*q3dd + (1sb*1ta*ms*cos((q2+-1*q3))*q3dd + (1sa*ms*cos((q2+-1*q3)))*q3dd + (1sa*ms* $1 \\ tb * ms * cos ((q2 + -1 * q3)) * q3dd + (1sb * 1tb * ms * cos ((q2 + -1 * q3)) * q3dd + (2 * 1sa * 1ta * mt * cos ((q2 + -1 * q3)) * q3dd + (2 * 1sa * 1ta * mt * cos ((q3 + -1 * q3)) * q3dd + (q3 + q3)) *$ q2 + -1 * q3)) * q3dd + (2 * lsb * lta * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb *
mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb * ltb * mt * cos ((q2 + -1 * q3)) * q3dd + (lsa * ltb *q3dd + (1sb*1tb*mt*cos((q2+-1*q3))*q3dd + (1ba*1sa*mb*cos((q2+-1*q4))*q4dd + (1ba*1sb*mt*cos((q2+-1*q4)))*q4dd + (1ba*1sb*mt*cos((q2+-1*q4)))*q4dd + (1ba*1sb*mt*cos((q2+-1*q4)))*q4dd + (1ba*1sa*mb*cos((q2+-1*q4)))*q4dd + (1ba*1sa*mb*cos((q2+-1*mb * cos((q2 + -1 * q4)) * q4dd + (-1 * lsa * lta * mf * cos((q2 + -1 * q5))) * q5dd + (-1 * lsb * lta * mf * cos((q2 + -1 * q5))) * q5dd + (-1 * lsb * lta * mf * cos((q3 + -1 * q5))) * q5dq2 + -1 * q5)) * q5dd + (-1 * lsa * ltb * mf * cos ((q2 + -1 * q5)) * q5dd + (-1 * lsb * ltb * mf * cos ((q2 + -1 * q5)) * q5dd + (-1 *)*q5dd+(-1*lsa*lta*ms*cos((q2+-1*q5))*q5dd+(-1*lsb*lta*ms*cos((q2+-1*q5))*q5dd+(-1*lsb*lta*ms*cos((q2+-1*q5))*q5dd+(-1*lsb*lta*ms*cos((q2+-1*q5))*q5dd+(-1*lsb*lta*ms*cos((q2+-1*q5)))*q5dd*q*cos((q2+-1*q5))*q5dd+(-1*q5)*q5d*q*q*cos((q2+-1*q5))*q5d*q*q*cos((q2+-1*q5))*q5d*q*q*q*cos((q2+-1*q5))*q5d*q*q*q*q*1*1sa*1tb*ms*cos((q2+-1*q5))*q5dd+(-1*1sb*1tb*ms*cos((q2+-1*q5))*q5dd+(-1*1sa*1tb*ms*cos((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2+-1*q5))*q5d((q2
$*mt*cos((q2+-1*q5))*q5dd+(-1*lsb*ltb*mt*cos((q2+-1*q5))*q5dd+(-1*(lsa)^{(2)}*mf*cos((q2+-1*q5)))*q5d((q2+-1*q5))*$ $(\ (q2+-1*q6)\)*q6dd+(-2*lsa*lsb*mf*cos(\ (q2+-1*q6)\)*q6dd+(-1*(lsb)^{^{\prime}}(2)*mf*cos(\ (q2+-1*q6)\)*q6dd+(-1*(lsb)^{^{\prime$ *q6)) $*q6dd+(-1*lsa*lsb*ms*cos((q2+-1*q6))*q6dd+(-1*(lsb)^(2)*ms*cos((q2+-1*q6))*$ q6dd + (-1*1fd*1sa*mf*cos((q2+-1*q7))*q7dd + (-1*1fd*1sb*mf*cos((q2+-1*q7))*q7dd + (1fa*q7)) + (1fa*q7) + (1*lsa*mf*sin((q2+-1*q7))*q7dd+(-1*lfe*lsa*mf*sin((q2+-1*q7))*q7dd+(lfa*lsb*mf*sin((q2+-1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7)))*q7dd+(lfa*lsb*mf*sin((q2+1*q7(q2+-1*q7))*q7dd+(-1*lfe*lsb*mf*sin((q2+-1*q7))*q7dd+(-1*lsa*mb*cos(q2)*q8dd+(-1*lsa*mb*cos(q2)*q8dd+(-1*lfe*lsb*mf*sin((q2+-1*q7)))*q7dd+(-1*lfe*lsb*mf*sin(lsb*mb*cos(q2)*q8dd+(-1*lsa*mf*cos(q2)*q8dd+(-1*lsb*mf*cos(q2)*q8dd+(-2*lsa*ms*) $\cos(q2)*q8dd+(-1*lsb*ms*cos(q2)*q8dd+(-2*lsa*mt*cos(q2)*q8dd+(-2*lsb*mt*cos(q2$ q8dd + (-1*lsa*mb*sin(q2)*q9dd + (-1*lsb*mb*sin(q2)*q9dd + (-1*lsa*mf*sin(q2)*q9dd + (-1*lsa*mf*sin(q2)*q9d + (-1*lsa*mf*sin(q1 sb * mf * sin (q2) * q9dd + (-2 * 1sa * ms * sin (q2) * q9dd + (-1 * 1sb * ms * sin (q2) * q9dd + (-2 * 1sa * mt * sin
(q2) * q9dd + (-2 * 1sa * mt * sin (q2) * q9dd + (-2 * 1sa * mt * si)))))))))))))))))))))))))))))))))))))))))))))

dyn3 = HurGlobalELEquation[[3]]; HurToJulia[dyn3]

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(-1*tau2+(tau3+(lambda4*lta*cos(q3)+(lambda4*ltb*cos(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*sin(q3)+(lambda5*lta*
                                    lambda5*ltb*sin(q3) + (-1*g*lta*mb*sin(q3) + (-1*g*ltb*mb*sin(q3) + (-1*g*lta*mf*sin(q3) 
                                    ) + (-1*g*ltb*mf*sin(q3) + (-1*g*lta*ms*sin(q3) + (-1*g*ltb*ms*sin(q3) + (-2*g*lta*mt*sin(q3) + (-2*g*lta*mt*sin
                                       (q3) + (-1 * g * 1 t b * m t * sin (q3) + (-1 * (1 t b * (mb + (mf + (ms + mt)))) + 1 t a * (mb + (mf + (ms + 2 * mt)))) * (mf + (ms + 2 * mt)) )) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) ) * (mf + (ms + 2 * mt)) ) (mf + 2 * mt)) ) * (mf + (mf + 2 * mt)) ) ) * (mf + 2 * mt)) ) (mf + 2 * mt)) (mf + 2 * mt)
                                    (mf+(ms+mt)))+lta*(mb+(mf+(ms+2*mt))))*sin((q2+-1*q3))*(q2d)^(2)+(lba*lta*mb*sin)
                                      ((q3+-1*q4))*(q4d)^{(2)}+(1ba*1tb*mb*sin((q3+-1*q4))*(q4d)^{(2)}+(-1*(1ta)^{(2)}*mf*)
                                    \sin((q3+-1*q5))*(q5d)^{(2)}+(-2*lta*ltb*mf*sin((q3+-1*q5))*(q5d)^{(2)}+(-1*(ltb)^{(2)}+(-1*(ltb)^{(2)})*(q5d)^{(3)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^{(4)}+(-1*(ltb)^
                                      *mf*sin((q3+-1*q5))*(q5d)^{(2)}+(-1*(1ta)^{(2)}*ms*sin((q3+-1*q5))*(q5d)^{(2)}+(-2*1ta)^{(2)}
                                    *ltb*ms*sin((q3+-1*q5))*(q5d)^(2)+(-1*(ltb)^(2)*ms*sin((q3+-1*q5))*(q5d)^(2)+(-1*q5))*(q5d)^(2)+(-1*q5))*(q5d)^(2)+(-1*q5))*(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5)(q5d)^(2)+(-1*q5
                                      *lta*ltb*mt*sin((q3+-1*q5))*(q5d)^(2)+(-1*(ltb)^(2)*mt*sin((q3+-1*q5))*(q5d)^(2)
                                    +(-1*lsa*lta*mf*sin((q3+-1*q6))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)))*(q6d)^(2)+(-1*lsb*lta*mf*sin((q3+-1*q6)
                                    ) + (-1 * 1 sa * 1 tb * mf * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1 sb * 1 tb * mf * sin ( (q3 + -1 * q6) ) * (q6d) ^ (q8 + -1 * q6) ) * (q6d) ^ (q8 + -1 * q6) ) * (q6d) ^ (q8 + -1 * q6) ) * (q8d) ^ (q8 + -1 * q6) ) * (q8d) ^ (q
                                      (2) + (-1 * 1sb * 1ta * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * 1tb * ms * sin ( (q3 + -1 * q6) ) * (q6d) ^ (2) + (-1 * 1sb * q6) ^ (2) 
                                    ) ^ (2) + (-1 * 1 f a * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) * (q 7 d) ^ (2) + (1 f e * 1 t a * m f * cos ( (q 3 + -1 * q 7) ) *
                                      (2) + (-1 * 1 f a * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q3 + -1 * q7) ) * (
                                    ) + (-1 * 1 f d * 1 t a * m f * sin ( (q3 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 f d * 1 t b * m f * sin ( (q3 + -1 * q7) ) * (q7d) ^ 
                                      (2) + (1 + c * 1 + a * mb * cos ((q1 + -1 * q3)) * q1 + (1 + d * 1 + a * mb * cos ((q1 + -1 * q3)) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + (1 + c * 1 + b * mb * cos ((q1 + -1 * q3))) * q1 + 
                                    *\cos((q1+-1*q3))*q1dd+(lfd*ltb*mb*cos((q1+-1*q3))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfd*ltb*mb*cos((q1+-1*q3)))*q1dd+(lfd*ltb*mb*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfd*ltb*mb*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1+-1*q3)))*q1dd+(lfc*lta*mf*cos((q1
                                    )*q1dd+(1fd*1ta*mf*cos((q1+-1*q3))*q1dd+(1fc*1tb*mf*cos((q1+-1*q3))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1dd+(1fd*1tb*mf*cos((q1+-1*q3)))*q1d+(1fd*1tb*mf*cos((q1+-1*q3)))*q1d+(
                                      *mf*cos((q1+-1*q3))*q1dd+(1fc*lta*ms*cos((q1+-1*q3))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1dd+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(1fd*lta*ms*cos((q1+-1*q3)))*q1d+(
                                     \tt{q3))*q1dd+(1fc*ltb*ms*cos((q1+-1*q3))*q1dd+(1fd*ltb*ms*cos((q1+-1*q3))*q1dd+(2*xd+1))*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1dd+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)*q1d+(2*xd+1)
                                 \cos((q1+-1*q3))*q1dd+(1fd*1tb*mt*cos((q1+-1*q3))*q1dd+(-1*1fe*1ta*mb*sin((q1+-1*q3))*q1dd+(-1*q3))*q1dd+(-1*q3))*q1dd+(-1*q3))
                                  \tt{q3))*q1dd+(-1*lfe*ltb*mb*sin((q1+-1*q3))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1d+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1d+(-1*lfe*lta*mf*sin((q1+-1*q3)))*q1d+(
                                      +(-1*lfe*ltb*mf*sin((q1+-1*q3))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*ms*sin((q1+-1*q3)))*q1dd+(-1*lfe*lta*
                                    ltb*ms*sin((q1+-1*q3))*q1dd+(-2*lfe*lta*mt*sin((q1+-1*q3))*q1dd+(-1*lfe*ltb*mt*)
                                    \sin((q1+-1*q3))*q1dd+(1sa*1ta*mb*cos((q2+-1*q3))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3))*q1dd+(1sa*1ta*mb*cos((q2+-1*q3))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3))*q2dd+(1sb*1ta*mb*cos((q2+-1*q3)))*q2dd+(1sb*1ta*mb*cos((q2+-1*q
                                      *q2dd + (1sa*1tb*mb*cos((q2+-1*q3))*q2dd + (1sb*1tb*mb*cos((q2+-1*q3))*q2dd + (1sa*1ta*mb*cos((q2+-1*q3)))*q2dd + (1sa*1ta*mb*cos((q2+-1
                               \mathsf{mf} \star \mathsf{cos} \left( \, \left( \mathsf{q2} + -1 \star \mathsf{q3} \right) \, \right) \\ \star \mathsf{q2dd} + \left( \mathsf{1sb} \star \mathsf{1ta} \star \mathsf{mf} \star \mathsf{cos} \left( \, \left( \mathsf{q2} + -1 \star \mathsf{q3} \right) \, \right) \\ \star \mathsf{q2dd} + \left( \mathsf{1sa} \star \mathsf{1tb} \star \mathsf{mf} \star \mathsf{cos} \left( \, \left( \mathsf{q2} + -1 \star \mathsf{q3} \right) \, \right) \\ \star \mathsf{q2dd} + \left( \mathsf{q3} + -1 \star \mathsf{q3} \right) \right) \\ \star \mathsf{q2dd} + \left( \mathsf{q3} + -1 \star \mathsf{q3} \right) \\ \star \mathsf{q3} + -1 \star \mathsf{q3} + -1 \star \mathsf{q3} \\ \star \mathsf{q3} + -1 \star \mathsf{q3} + -1 \star \mathsf{q3} \\ \star \mathsf{q3} + -1 \star \mathsf{q3} + -1 \star \mathsf{q3} \\ \star \mathsf{q3} + -1 \star \mathsf{q3} + -1 \star \mathsf{q3} \\ \star \mathsf{q3} + -1 \star \mathsf{q3} \\ \star \mathsf{q3} + -1 \star \mathsf{q3} + -1 \star \mathsf{q3} \\ \mathsf{q3} + -1 \star \mathsf{q3} \\ \star \mathsf{q3} + -1 \star \mathsf{q3} \\ \star \mathsf{q3} + -1 \star \mathsf{q3} 
                                  q3)) *q2dd + (1sb*1tb*mf*cos((q2+-1*q3))*q2dd + (1sa*1ta*ms*cos((q2+-1*q3))*q2dd + (1sb*1ta*ms*cos((q2+-1*q3))*q2dd + (1sb*1ta*ms*cos((q2+-1*q3)))*q2dd + (1sb*1tb*mf*cos((q2+-1*q3)))*q2dd + (1sb*1tb*mf*cos((
                                 -1*q3) )*q2dd+(2*lsa*lta*mt*cos((q2+-1*q3))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(q2*lsb*lta*mt*cos((q2+-1*q3)))*q2dd+(
                                  \\  q2dd + (1sa * 1tb * mt * cos ((q2 + -1 * q3)) * q2dd + (1sb * 1tb * mt * cos ((q2 + -1 * q3)) * q2dd + (Itz * q3dd + (1sb * 1tb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * 1tb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * 1tb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (Itz * q3dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 + -1 * q3))) * q2dd + (1sb * mt * cos ((q2 +
                                      ((1ta)^{(2)}*mb*q3dd+(2*1ta*1tb*mb*q3dd+((1tb)^{(2)}*mb*q3dd+((1ta)^{(2)}*mf*q3dd+(2*tb)^{(2)}*mb*q3dd+((1ta)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb)^{(2)}*mb*q3dd+((2*tb
                                    2) *ms*q3dd + (2*(1ta)^{(2)}*mt*q3dd + (2*1ta*1tb*mt*q3dd + ((1tb)^{(2)}*mt*q3dd + (1ba*1ta*mb)) + (1ta*1ta*mb) + (1ta*1ta*m
                                      *\cos ((q3+-1*q4))*q4dd+(lba*ltb*mb*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4dd+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4d+(-1*(lta)^(2)*mf*cos((q3+-1*q4))*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+(-1*(lta)^(2)*q4d+
                                 1*q5))*q5dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q5dd+(-1*(ltb)^{(2)}*mf*cos((q3+-1*q5))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dd+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1*q5)))*q5dq+(-1*(ltb)^{(3)}*mf*cos((q3+-1
                                 q5dd + (-1*(1ta)^{2})*ms*cos((q3+-1*q5))*q5dd + (-2*1ta*1tb*ms*cos((q3+-1*q5))*q5dd + (-2*1ta*1tb*ms*cos((q3+-1*q5)))*q5dd + (-2*1ta*1tb*ms*cos((q3+-1*q5))*q5dd + (-2*1ta*1tb*ms*cos((q3+-1*q5))*q5dd + (-2*1ta*1tb*ms*cos((q3+-1*q5))*q5dd + (-2*1ta*1tb*ms*cos((q3+-1*q5))*q5dd + (-2*1ta*1tb*
                                 1* (1tb)^{(2)} *m* *cos((q3+-1*q5)) *q5dd + (-1*1ta*1tb*mt*cos((q3+-1*q5)) *q5dd + (-1*(1tb)) *q5dd + (-1*
                                 (2) *mt*cos((q3+-1*q5))*q5dd+(-1*lsa*lta*mf*cos((q3+-1*q6))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos((q3+-1*q6)))*q6dd+(-1*lsb*lta*mf*cos
                                    cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsa*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + \, (-1*lsb*ltb*mf*cos\left( \, (q3+-1*q6) \, \right) \\ *q6dd \\ + 
                                    1*q6)) *q6dd+(-1*lsb*lta*ms*cos((q3+-1*q6))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*ms*cos((q3+-1*q6)))*q6dd+(-1*lsb*ltb*q6))*q6dd+(-1*lsb*ltb*q6)((q3+-1*q6))*q6dd+(-1*lsb*ltb*q6)((q3+-1*q6))*q6d+(-1*lsb*ltb*q6)((q3+-1*q6))*q6d+(-1*lsb*ltb*q6)((q3+-1*q6))*q6d+(-1*lsb*ltb*q6)((q3+-1*q6))*q6d
                                 q6dd + (-1*1fd*1ta*mf*cos((q3+-1*q7))*q7dd + (-1*1fd*1tb*mf*cos((q3+-1*q7))*q7dd + (1fa*q7))*q7dd + (1fa*q7))*q7dd + (1fa*q7)*q7dd + (1fa*q7
                                    *lta*mf*sin((q3+-1*q7))*q7dd+(-1*lfe*lta*mf*sin((q3+-1*q7))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*ltb*mf*sin((q3+-1*q7)))*q7dd+(lfa*lt
                                      (q3+-1*q7))*q7dd+(-1*lfe*ltb*mf*sin((q3+-1*q7))*q7dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8dd+(-1*lta*mb*cos(q3)*q8d+(-1*lta*mb*cos(q3)*q8d+(-1*lta*mb*cos(q3)*q8d+(-1*lta*mb*cos(q3)*q8d+(-1*lta*mb*cos(q3)*q8d+(-1*
                                 1 + b * mb * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd + (-1 * 1 + a * mf * cos(q3) * q8dd 
                                    \cos(q3)*q8dd+(-1*ltb*ms*cos(q3)*q8dd+(-2*lta*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3)*q8dd+(-1*ltb*mt*cos(q3
                                 q8dd + (-1*lta*mb*sin(q3)*q9dd + (-1*ltb*mb*sin(q3)*q9dd + (-1*lta*mf*sin(q3)*q9dd + (-1*lta*m
                                    ))))))))
```

dyn4 = HurGlobalELEquation[[4]]; HurToJulia[dyn4]

```
(-1*tau3+(tau4+(-1*g*lba*mb*sin(q4)+(-1*lba*mb*(lfe*cos((q1+-1*q4))+(lfc+lfd)*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfc+lfd))*sin((lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+-1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q4))+(lfe*cos((q1+1*q
                             q1+-1*q4)\;)\;)*(q1d)^{(2)}+(-1*lba*(lsa+lsb)*mb*sin((q2+-1*q4))*(q2d)^{(2)}+(-1*lba*lta+lsb)*mb*sin((q2+-1*q4))*(q2d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba*lta+lsb)*(q1d)^{(2)}+(-1*lba
                             *mb*sin((q3+-1*q4))*(q3d)^(2)+(-1*lba*ltb*mb*sin((q3+-1*q4))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*q4)))*(q3d)^(2)+(lba*lfc*mb*sin((q3+-1*
                        mb*cos((q1+-1*q4))*q1dd+(lba*lfd*mb*cos((q1+-1*q4))*q1dd+(-1*lba*lfe*mb*sin((q1+-1*q4)))*q1dd+(-1*q4))
                           1ba*1ta*mb*cos((q3+-1*q4))*q3dd+(1ba*1tb*mb*cos((q3+-1*q4))*q3dd+(1bz*q4dd+((1ba))*q3dd+(1bz*q4dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q3dd+((1ba))*q
                             (2) *mb*q4dd+(-1*lba*mb*cos(q4)*q8dd+-1*lba*mb*sin(q4)*q9dd)))))))))))))))
```

dyn5 = HurGlobalELEquation[[5]]; HurToJulia[dyn5]

```
(-1*tau4+(tau5+(-1*lambda4*lta*cos(q5)+(-1*lambda4*ltb*cos(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*lta*sin(q5)+(-1*lambda5*l
                                       \tt q5) + (-1*lambda5*ltb*sin(q5) + (g*lta*mf*sin(q5) + (g*ltb*mf*sin(q5) + (g*lta*ms*sin(q5) + (g*lta*ms*sin(q5) + (g*lta*mf*sin(q5) + (g*lta*mf
                                         +(g*ltb*ms*sin(q5)+(g*ltb*mt*sin(q5)+((lta*(mf+ms)+ltb*(mf+(ms+mt))))*(lfe*cos((q1)+(g*ltb*ms*sin(q5)+(g*ltb*mt*sin(q5)+((lta*(mf+ms)+ltb*(mf+(ms+mt)))))))
                                         +-1*q5)) + (1fc+1fd) *sin((q1+-1*q5))) * (q1d)^(2) + ((lsa+lsb) * (lta*(mf+ms)+ltb*(mf+(lsa+lsb)))) + (lta*(mf+ms)+ltb*(mf+(lsa+lsb))) + (lta*(mf+(lsa+lsb))) + (lta*(mf+(ls
                                   \texttt{ms+mt})\;)\;)\;\star \\ \texttt{sin}\left(\;(q2+-1\star q5)\;\right)\;\star\;(q2d)\;^{\wedge}(2)\;+\;(\;(1ta)\;^{\wedge}(2)\;\star \\ \texttt{mf}\star \\ \texttt{sin}\left(\;(q3+-1\star q5)\;\right)\;\star\;(q3d)\;^{\wedge}(2)\;+\;(2\star q3d)\;^{\wedge}(2)\;+\;(2\star q3d)\;^{\vee}(2)\;+\;(2\star q3d)\;^{\vee}
                                      1ta) ^(2) *ms*sin((q3+-1*q5)) *(q3d)^(2) + (2*1ta*1tb*ms*sin((q3+-1*q5)) *(q3d)^(2) + ((q3+-1*q5)) *((q3+-1*q5)) *((q3
                                      1 + (q^3 + 1) + 
                                         )^{(2)} *mt*sin((q3+-1*q5))*(q3d)^{(2)} + (1sa*1ta*mf*sin((q5+-1*q6))*(q6d)^{(2)} + (1sb*1ta*mf*sin((q5+-1*q6)))*(q6d)^{(2)} + (1sb*1ta*mf*sin((q5+-1*q6
                                         *mf*sin((q5+-1*q6))*(q6d)^(2)+(lsa*ltb*mf*sin((q5+-1*q6))*(q6d)^(2)+(lsb*ltb*mf*)
                                         \sin((q5+-1*q6))*(q6d)^{(2)}+(1sb*1ta*ms*sin((q5+-1*q6))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+-1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5+1*q6)))*(q6d)^{(2)}+(1sb*1tb*ms*sin((q5
                                       q5 + -1 * q6) \ ) * (q6d) ^ (2) + (1 fa * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (-1 * 1 fe * 1 ta * mf * cos ( (q5 + -1 * q7) ) * (q7d) ^ (2) + (q7d) ^ (2) + (q7d) ^ (2) + (q
                                         +-1*q7)\;)*(q7d)^{\;\;}(2)+(1fa*1tb*mf*cos((q5+-1*q7))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+(-1*1fe*1tb*mf*cos((q5+-1*q7)))*(q7d)^{\;\;}(2)+
                                         -1*q7) * (q7d)^{(2)} + (1fd*1ta*mf*sin((q5+-1*q7))*(q7d)^{(2)} + (1fd*1tb*mf*sin((q5+-1*q7))*(q7d)^{(2)} + (1fd*1tb*mf*sin((q5+-1*q7))*(q7d)^{(2)} + (1fd*1tb*mf*sin((q5+-1*q7)))*(q7d)^{(2)} + (
                                         )\ )\ *\ (q7d)\ ^\ (2)\ +\ (-1*lfc*lta*mf*cos\left(\ (q1+-1*q5)\ \right)\ *\ q1dd+\ (-1*lfd*lta*mf*cos\left(\ (q1+-1*q5)\ \right)\ *
                                       q1dd + (-1*1fc*1tb*mf*cos((q1+-1*q5))*q1dd + (-1*1fd*1tb*mf*cos((q1+-1*q5)))*q1dd + (-1*1fd*1tb*mf*cos((q1+-1*q5))) + (-1*1fd*1tb*mf*cos((q
                                      1 fc * 1 ta * ms * cos ( (q1 + -1 * q5) ) * q1 dd + (-1 * 1 fd * 1 ta * ms * cos ( (q1 + -1 * q5) ) * q1 dd + (-1 * 1 fc * 1 tb * 1 ta * 1 t
                                       ms * cos((q1 + -1 * q5)) * q1dd + (-1 * 1fd * 1tb * ms * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * 1tb * mt * cos((q1 + -1 * q5))) * q1dd + (-1 * 1fc * q5)) * q1dd * (-1 * 1fc * q5)) * q1dd *
                                      q1+-1*q5)) *q1dd+(-1*1fd*1tb*mt*cos((q1+-1*q5))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1dd+(1fe*1ta*mf*sin((q1+-1*q5)))*q1d+(1fe*1ta*mf*sin((q1+-1*q5)))*q1d+(1fe*1ta*mf*sin((q1+
                                       q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * lta * ms * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1dd + (1fe * ltb * mf * sin ( (q1 + -1 * q5)) ) * q1d
                                   ms*sin((q1+-1*q5))*q1dd+(lfe*ltb*mt*sin((q1+-1*q5)))*q1dd+(-1*lsa*lta*mf*cos((q2+-1*q5)))*q1dd+(-1*lsa*lta*mf*cos((q2+-1*q5)))*q1dd+(-1*q5))
                                      1*q5))*q2dd+(-1*lsb*lta*mf*cos((q2+-1*q5))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd+(-1*lsa*ltb*mf*cos((q2+-1*q5)))*q2dd
                                       q2dd + (-1*lsb*ltb*mf*cos((q2+-1*q5))*q2dd + (-1*lsa*lta*ms*cos((q2+-1*q5))*q2dd + (-1*lsa*lta*ms*cos((q2+-1*q5))*q2dd + (-1*lsa*lta*ms*cos((q2+-1*q5)))*q2dd + (-1*lsa*lta
                                       1 sb * 1 ta * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sa * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd + (-1 * 1 sb * 1 tb * ms * cos ( (q2 + -1 * q5) ) * q2dd
                                      ms * cos((q2+-1*q5))*q2dd+(-1*lsa*ltb*mt*cos((q2+-1*q5))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*lsb*ltb*mt*cos((q2+-1*q5)))*q2dd+(-1*q5))*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5)*q2dd+(-1*q5
                                      q2+-1*q5))*q2dd+(-1*(lta)^(2)*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5)))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-2*lta*ltb*mf*cos((q3+-1*q5))*q3dd+(-
                                       q5)) *q3dd + (-1*(1tb)^(2) *mf *cos((q3 + -1*q5)) *q3dd + (-1*(1ta)^(2) *ms *cos((q3 + -1*q5)) *q3dd + (-1*(q3 + -1*q5)) *q3dd + (-1*
                                         *q3dd + (-2*1ta*1tb*ms*cos((q3+-1*q5))*q3dd + (-1*(1tb)^{(2)})*ms*cos((q3+-1*q5))*q3dd + (-1*(1tb)^{(2)})*q3dd + (-1*(1tb
                                         -1*lta*ltb*mt*cos((q3+-1*q5))*q3dd+(-1*(ltb)^(2)*mt*cos((q3+-1*q5))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5)))*q3dd+(Itz*mt*cos((q3+-1*q5
                                      q5dd + ((1ta)^{(2)}*mf*q5dd + (2*1ta*1tb*mf*q5dd + ((1tb)^{(2)}*mf*q5dd + ((1ta)^{(2)}*ms*q5dd + ((1ta)^{(2)}*ms*q5dd + ((1ta)^{(2)}*ms*q5dd + ((1ta)^{(2)}*mf*q5dd + ((1ta)^{(2)}*mf
                                            (2*lta*ltb*ms*q5dd+((ltb)^(2)*ms*q5dd+((ltb)^(2)*mt*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5dd+(lsa*lta*mf*cos((q5+-1*ms*q5d))))))))))))))))))))
                                       q6)) *q6dd + (1sb*1ta*mf*cos((q5+-1*q6))*q6dd + (1sa*1tb*mf*cos((q5+-1*q6))*q6dd + (1sb*mf*cos((q5+-1*q6)))*q6dd + (1sb*mf*
                                       1 \\ tb * mf * cos ( (q5 + -1 * q6)) * q6dd + (1sb * 1ta * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * 1tb * ms * cos ( (q5 + -1 * q6))) * q6dd + (1sb * q6)) * q6dd + (
                                         -1*q6) )*q6dd+(1fd*1ta*mf*cos((q5+-1*q7))*q7dd+(1fd*1tb*mf*cos((q5+-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7))*q7dd+(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-1*q7)(-
                                      1*lfa*lta*mf*sin((q5+-1*q7))*q7dd+(lfe*lta*mf*sin((q5+-1*q7))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*sin((q5+-1*q7)))*q7dd+(-1*lfa*ltb*mf*s
                                         *\sin((q5+-1*q7))*q7dd+(lfe*ltb*mf*sin((q5+-1*q7))*q7dd+(lta*mf*cos(q5)*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(q5))*q8dd+(ltb*mf*cos(
                                   mf*cos(q5)*q8dd+(1ta*ms*cos(q5)*q8dd+(1tb*ms*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8dd+(1tb*mt*cos(q5)*q8d+(1tb*mt*cos(q5)*q8d+(1tb*mt*cos(q5)*q8d+(1tb*mt*cos(q5)*q8d+(1tb*mt*cos(q5)*q8d+(1tb*mt*cos(q5)*q
                                      lta*mf*sin(q5)*q9dd+(ltb*mf*sin(q5)*q9dd+(lta*ms*sin(q5)*q9dd+(ltb*ms*sin(q5)*q9dd
```

dyn6 = HurGlobalELEquation[[6]]; HurToJulia[dyn6]

(-1*tau5+(tau6+(-1*lambda4*lsa*cos(q6)+(-1*lambda4*lsb*cos(q6)+(-1*lambda5*lsa*sin(q6)+(-1*lambda5*l $\mathsf{q6}) + (-1 * \mathsf{lambda5} * \mathsf{lsb} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsa} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{ms} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \sin (\mathsf{q6}) + (\mathsf{g} * \mathsf{lsb} * \mathsf{mf} * \mathsf{lsb} * \mathsf{lsb} * \mathsf{mf} * \mathsf{lsb} * \mathsf{ls$ $+ ((1sa*mf+1sb*(mf+ms)) * (1fe*cos((q1+-1*q6)) + (1fc+1fd) *sin((q1+-1*q6))) * (q1d) ^ (2) \\$ $+ \left(\; (1sa+1sb) \star (1sa \star mf + 1sb \star \; (mf + ms) \; \right) \star sin \left(\; (q2 + -1 \star q6) \; \right) \star (q2d) \; ^{\wedge} (2) \; + \; (1sa \star 1ta \star mf \star sin \left(\; (q3 + -1) \star q6 \; \right) \; + \; (q2d) \; ^{\wedge} (2) \; + \; (q2d) \; ^{\wedge} (2) \; + \; (q3d) \; + \; (q3$ *q6)) $*(q3d)^{(2)} + (1sb*1ta*mf*sin((q3+-1*q6))*(q3d)^{(2)} + (1sa*1tb*mf*sin((q3+-1*q6)))*(q3d)^{(2)} + ($ $*(q3d)^{(2)} + (1sb*1tb*mf*sin((q3+-1*q6))*(q3d)^{(2)} + (1sb*1ta*ms*sin((q3+-1*q6))*(q3d)^{(2)} + (1sb*1ta*ms*sin((q3+-1*q6)))*(q3d)^{(2)} + (q3d)^{(2)} + (q3d)^{(2)} + (q3d)^{(2)} + (q3d)^{(2)}$ $) ^ (2) + (1sb * 1tb * ms * sin ((q3 + -1 * q6)) * (q3d) ^ (2) + (-1 * 1sa * 1ta * mf * sin ((q5 + -1 * q6)) * (q5d) ^ ($ $(2) + (-1*1sb*1ta*mf*sin((q5+-1*q6))*(q5d)^(2) + (-1*1sa*1tb*mf*sin((q5+-1*q6))*(q5d)^(2) + (-1*1sb*1ta*mf*sin((q5+-1*q6)))*(q5d)^(2) + (-1*1sb*1ta*mf*s$ $) \, {}^{\wedge}(2) + (-1 \star 1 \mathsf{sb} \star 1 \mathsf{tb} \star \mathsf{mf} \star \mathsf{sin} \, (\, (\mathsf{q5} + -1 \star \mathsf{q6}) \,\,) \, \star \, (\mathsf{q5d}) \, {}^{\wedge}(2) + (-1 \star 1 \mathsf{sb} \star 1 \mathsf{ta} \star \mathsf{ms} \star \mathsf{sin} \, (\, (\mathsf{q5} + -1 \star \mathsf{q6}) \,\,) \, \star \, (\, \mathsf{q5d}) \, {}^{\wedge}(2) + (-1 \star 1 \mathsf{sb} \star 1 \mathsf{ta} \star \mathsf{ms} \star \mathsf{sin} \, (\, \mathsf{q5d} + -1 \star \mathsf{q6}) \,\,) \, \star \, (\, \mathsf{q5d} + -1 \star \mathsf{q5d}) \,\,) \, \star \, (\, \mathsf{q5d} + -1 \star \mathsf{q5d}) \,\,) \, , \, (\, \mathsf{q5d} + -1 \star \mathsf{q5d}) \,\,) \, , \, (\, \mathsf{q5d} + -1 \star \mathsf{q5d}) \,\,$ $q5d) ^ (2) + (-1 * lsb * ltb * ms * sin ((q5 + -1 * q6)) * (q5d) ^ (2) + (lfa * lsa * mf * cos ((q6 + -1 * q7)) * (1) *$ $q7d) ^ (2) + (-1 * 1 fe * 1 sa * mf * cos ((q6 + -1 * q7)) * (q7d) ^ (2) + (1 fa * 1 sb * mf * cos ((q6 + -1 * q7)) * (q7d) ^ (2) + (1 fa * 1 sb * mf * cos ((q6 + -1 * q7)) * (q7d) ^ (2) + (1 fa * 1 sb * mf * cos ((q6 + -1 * q7))) * (q7d) ^ (2) + (q7d) ^ (2) +$ q7d) $^{(2)} + (-1*lfe*lsb*mf*cos((q6+-1*q7))*(q7d)^{(2)} + (lfd*lsa*mf*sin((q6+-1*q7))*(q7d)^{(2)} + (lfd*lsa*mf*sin((q6+-1*q7)))*(q7d)^{(2)} + (lfd*l$ q7d) $^{(2)} + (1fd*1sb*mf*sin((q6+-1*q7))*(q7d)^{(2)} + (-1*1fc*1sa*mf*cos((q1+-1*q6))*$ q1dd + (-1 * 1fd * 1sa * mf * cos ((q1 + -1 * q6)) * q1dd + (-1 * 1fc * 1sb * mf * cos ((q1 + -1 * q6)) * q1ddms * cos((q1+-1*q6))*q1dd+(lfe*lsa*mf*sin((q1+-1*q6))*q1dd+(lfe*lsb*mf*sin((q1+-1*q6)))*q1d+(lfe*lsb*mf*sin((q1+-1*q6)))*q1d+(lfe*lsb*mf*sin((q1+-1*q6)))*q1d+(lfe*lsb*mf*sin($q6)) *q1dd + (1fe *lsb *ms *sin((q1 + -1 *q6)) *q1dd + (-1 *(lsa)^{(2)} *mf *cos((q2 + -1 *q6)) *q2dd + (-1 *(lsa)^{(2)} *mf *cos((q$ $(-2 \times 1sa \times 1sb \times mf \times cos \ (\ (q2 + -1 \times q6)\) \ \times q2dd + \ (-1 \times (1sb)\ ^{\wedge}(2) \times mf \times cos \ (\ (q2 + -1 \times q6)\) \ \times q2dd + \ (-1 \times 1sa) \times q2dd + \$ $*1sb*ms*cos((q2+-1*q6))*q2dd+(-1*(1sb)^(2)*ms*cos((q2+-1*q6))*q2dd+(-1*1sa*1ta*mf)$ $\star cos\left(\,\left(q3+-1\star q6\right)\,\right) \\ \star q3dd \\ + \left(\,-1\star 1sb\star 1ta\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right) \\ \star q3dd \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ \star q3dd \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ \star q3dd \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ \star q3dd \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ \star q3dd \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ \star q3dd \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\,\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star mf \star cos\left(\,\left(q3+-1\star q6\right)\right)\right) \\ + \left(\,-1\star 1sa\star 1tb\star m$ -1*q6))*q3dd+(-1*lsb*ltb*mf*cos((q3+-1*q6))*q3dd+(-1*lsb*lta*ms*cos((q3+-1*q6))*q3dd+(-1*lsb*lta*ms*cos((q3+-1*q6))*q3d+(-1*q6))*q3d+(-1*q6))*q3dd+(-1*lsb*lta*q6)*q3d+(-1*q6))*q3d+(-1*q6)*q3dq3dd + (-1*lsb*ltb*ms*cos((q3+-1*q6))*q3dd + (lsa*lta*mf*cos((q5+-1*q6))*q5dd + (lsb*ms*cos((q5+-1*q6)))*q5dd + (lsb*ms*cos($-1*q6)\;)\; *q5dd + \; (1sb*1ta*ms*cos\left(\; (q5+-1*q6)\;\right)\; *q5dd + \; (1sb*1tb*ms*cos\left(\; (q5+-1*q6)\;\right)\; *q5dd + \;$ $Isz*q6dd+((1sa)^{(2)}*mf*q6dd+(2*1sa*1sb*mf*q6dd+((1sb)^{(2)}*mf*q6dd+$ q6dd + (1fd * 1sa * mf * cos ((q6 + -1 * q7)) * q7dd + (1fd * 1sb * mf * cos ((q6 + -1 * q7)) * q7dd + (-1 * 1fa * 1faq6+-1*q7)) *q7dd+(1fe*1sb*mf*sin((q6+-1*q7))*q7dd+(1sa*mf*cos(q6)*q8dd+(1sb*mf*cos(q6))*q8dd+(1sb*mf*cos(q(q6) *q8dd+(lsb*ms*cos(q6) *q8dd+(lsa*mf*sin(q6) *q9dd+(lsb*mf*sin(q6) *q9dd+lsb*ms*)))))

dyn7 = HurGlobalELEquation[[7]]; HurToJulia[dyn7]

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(-1*tau6 + (lambda5*lfa*cos(q7) + (lambda5*lfb*cos(q7) + (-1*lambda4*lfc*cos(q7) + (-1*lambda4*lfc*cos(q7) + (-1*lambda4*lfc*cos(q7) + (-1*lambda5*lfa*cos(q7) + (-1*lambda5
                                      lambda4*lfd*cos(q7) + (-1*lambda5*lfe*cos(q7) + (-1*g*lfa*mf*cos(q7) + (g*lfe*mf*cos(q7) + (-1*g*lfa*mf*cos(q7) 
                                      ) + (-1*lambda4*lfa*sin(q7) + (-1*lambda4*lfb*sin(q7) + (-1*lambda5*lfc*sin(q7) + (-1*lambda5*
                                   *1fc*1fe)*cos((q1+-1*q7))+(1fc*1fd+((1fd)^(2)+(-1*1fa*1fe+(1fe)^(2))))*sin((q1+-1*q7))+(1fc*1fd)*(q1+-1*q7))
                                   1*q7)) \times (q1d)^{(2)} + ((1sa+1sb)*mf*((1fa+-1*1fe)*cos((q2+-1*q7))+1fd*sin((q2+-1*q7)))
                                      ))*(q2d)^{(2)}+(1fa*1ta*mf*cos((q3+-1*q7))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1ta*mf*cos((q3+-1*q7)))*(q3d)^{(2)}+(-1*1fe*1
                                      ) * (q3d)^{(2)} + (1fa*1tb*mf*cos((q3+-1*q7))*(q3d)^{(2)} + (-1*1fe*1tb*mf*cos((q3+-1*q7)))
                                      \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1ta \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; (2) \; + \; (1fd \star 1tb \star mf \star sin \left( \; (q3 + -1 \star q7) \; \right) \; \star \; (q3d) \; ^{ } \; 
                                      ) ^{(2)} + (-1*1fa*1ta*mf*cos((q5+-1*q7))*(q5d)^{(2)} + (1fe*1ta*mf*cos((q5+-1*q7))*(q5d)^{(2)} + (1fe*1ta*mf*cos((q5+-1*q7))*(q5d)^{(2)} + (1fe*1ta*mf*cos((q5+-1*q7))*(q5d)^{(2)} + (1fe*1ta*mf*cos((q5+-1*q7))*(q5d)^{(2)} + (1fe*1ta*mf*cos((q5+-1*q7)))*(q5d)^{(2)} + (1fe*1ta*mf*co
                                        (2) + (-1 * 1 f a * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5 + -1 * q7) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5d) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5d) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5d) ) * (q5d) ^ (2) + (1 f e * 1 t b * m f * cos ( (q5d) ) * (q5d) ^ (2) + (q5d) ^ (2) +
                                      ) + (-1*1fd*1ta*mf*sin((q5+-1*q7))*(q5d)^(2) + (-1*1fd*1tb*mf*sin((q5+-1*q7))*(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d)^(q5d
                                      (2) + (-1*1fa*1sa*mf*cos((q6+-1*q7))*(q6d)^(2) + (1fe*1sa*mf*cos((q6+-1*q7))*(q6d)^(2) + (1fe*1sa*mf*cos((q6+-1*q7))*(q6d)^(2) + (1fe*1sa*mf*cos((q6+-1*q7)))*(q6d)^(2) + (1fe*1sa*mf*cos((q6+1*q7)))*(q6d)^(2) + (
                                      ) + (-1*1fa*1sb*mf*cos((q6+-1*q7))*(q6d)^(2) + (1fe*1sb*mf*cos((q6+-1*q7))*(q6d)^(2) + (1fe*1sb*mf*cos((q6+-1*q7))*(q6d)^(2) + (1fe*1sb*mf*cos((q6+-1*q7)))*(q6d)^(2) + (1fe*1sb*mf*cos((q6+-1*q7)))*(q
                                      + \; (-1 * lfd * lsa * mf * sin \left( \; (q6 + -1 * q7) \; \right) * \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) * \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) * \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (-1 * lfd * lsb * mf * sin \left( \; (q6 + -1 * q7) \; \right) \; + \; (q6d) \; ^{\wedge} \; (2) \; + \; (q6d) \; + \; (q6d) \; + \; (q6d) \; + \; (q6d) \; + \; (q
                                      ) + (-1 * 1 f c * 1 f d * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (-1 * (1 f d) ^ (2) * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) * q1 d d + (1 f a * m f * cos ( (q1 + -1 * q7) ) ) * q1 d d + (1 
                                   1 fe * mf * cos ( (q1 + -1 * q7)) * q1dd + (-1 * (1fe) ^ (2) * mf * cos ( (q1 + -1 * q7)) * q1dd + (1fa * 1fc * mf * sin + 
                                        ((q1+-1*q7))*q1dd+(1fa*1fd*mf*sin((q1+-1*q7))*q1dd+(-1*1fc*1fe*mf*sin((q1+-1*q7)))*q1dd+(-1*q7))
                                      *q1dd + (-1*1fd*1sa*mf*cos((q2+-1*q7))*q2dd + (-1*1fd*1sb*mf*cos((q2+-1*q7))*q2dd + (-1*1fd*1sb*mf*cos((q2+-1*q7))*q2dd + (-1*1fd*1sb*mf*cos((q2+-1*q7)))*q2dd + (-1*1fd*1sb
                                      \sin((q_2+-1*q_7))*q_2dd+(-1*lfe*lsb*mf*sin((q_2+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7))*q_2dd+(-1*lfd*lta*mf*cos((q_3+-1*q_7)
                                   1*q7))*q3dd+(-1*lfd*ltb*mf*cos((q3+-1*q7))*q3dd+(lfa*lta*mf*sin((q3+-1*q7))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7)))*q3dd+(lfa*lta*mf*sin((q3+-1*q7
                                        (-1*lfe*lta*mf*sin((q3+-1*q7))*q3dd+(lfa*ltb*mf*sin((q3+-1*q7))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((q3+-1*q7)))*q3dd+(-1*lfe*ltb*mf*sin((
                                 \mathsf{mf} \star \mathsf{sin} \left( \, \left( \mathsf{q3} + -1 \star \mathsf{q7} \right) \, \right) \, \star \mathsf{q3dd} + \left( \mathsf{1fd} \star \mathsf{1ta} \star \mathsf{mf} \star \mathsf{cos} \left( \, \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \right) \, \star \mathsf{q5dd} + \left( \mathsf{1fd} \star \mathsf{1tb} \star \mathsf{mf} \star \mathsf{cos} \left( \, \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \right) \, \star \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \right) \, \star \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q7} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \left( \mathsf{q5} + -1 \star \mathsf{q5} \right) \, \mathsf{q5dd} + \mathsf{q5dd}
                                   q7)) *q5dd+(-1*1fa*1ta*mf*sin((q5+-1*q7))*q5dd+(1fe*1ta*mf*sin((q5+-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7))*q5dd+(-1*q7)
                                   1*1fa*1tb*mf*sin((q5+-1*q7))*q5dd+(1fe*1tb*mf*sin((q5+-1*q7))*q5dd+(1fd*1sa*mf*)
                                   \cos ((q6+-1*q7))*q6dd+(1fd*lsb*mf*cos((q6+-1*q7))*q6dd+(-1*lfa*lsa*mf*sin((q6+-1*q7)))*q6dd+(-1*lfa*lsa*mf*sin((q6+-1*q7)))*q6dd+(-1*q7))
                                   q7)) *q6dd+(lfe*lsa*mf*sin((q6+-1*q7)) *q6dd+(-1*lfa*lsb*mf*sin((q6+-1*q7)) *q6dd+(-1*lfa*lsb*mf*sin((q6+-1*q7)) *q6dd+(-1*lfa*lsb*mf*sin((q6+-1*q7))) *q6dd+(-1*lfa*lsb*mf*sin((q6+1*q7))) *q6dd+
                                   1 fe * 1 sb * mf * sin ( (q6 + -1 * q7) ) * q6dd + (1 fz * q7dd + ( (1fa) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf * q7dd + ( (1fd) ^ (2) * mf
                                   -2*1fa*1fe*mf*q7dd+((1fe)^(2)*mf*q7dd+(1fd*mf*cos(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8dd+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)*q8d+(1fa*mf*sin(q7)
                                   -1 * lfe * mf * sin (q7) * q8dd + (-1 * lfa * mf * cos (q7) * q9dd + (lfe * mf * cos (q7) * q9dd + lfd * mf * sin (q7) * q8dd + (lfe * mf * cos (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q8dd + (lfe * mf * cos (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q8dd + (lfe * mf * cos (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd + lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * mf * sin (q7) * q9dd * lfd * lfd * mf * sin (q7) * q9dd * lfd * lfd * mf * sin (q7) * q9dd * lfd * lfd
                                      )))))
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dyn8 = HurGlobalELEquation[[8]]; HurToJulia[dyn8]

(-1*lambda1+(-1*lambda4+(((lfa*mf+lfe*(mb+(mf+2*(ms+mt)))))*cos(q1)+(lfd*(mb+(mf+2*(ms+mt)))))*cos(q1)+(lfd*(mb+(mf+2*(ms+mt)))))) $ms+mt)))+lfc*(mb+2*(mf+(ms+mt))))*sin(q1))*(q1d)^(2)+((lsb*(mb+(mf+(ms+2*mt)))+(lsb*(mb+(mf+(ms+2*mt)))+(lsb*(mb+(mf+(ms+2*mt)))+(lsb*(mb+(ms+mt))))+(lsb*(mb+(ms+mt))))+(lsb*(mb+(ms+mt))))+(lsb*(mb+(ms+mt))))+(lsb*(mb+(ms+mt)))+(lsb*(mb+(ms+mt)))+(lsb*(mb+(ms+mt))))+(lsb*(mb+(ms+mt)))+(lsb*(mb+(ms+mt))))+(lsb*(mb+(ms+mt))+(lsb*(mb+(ms+mt)))+(lsb*(mb+(ms+mt))+(lsb*(mb+(ms+mt)))+(lsb*(mb+(ms+mt)))+(lsb*(mb+(ms+mt)))+(lsb*(ms+(ms+mt)))+(lsb*(ms+(ms+mt)))+(lsb*(ms+(ms+mt)))+(lsb*(ms+(ms+mt))+(lsb*(ms+(ms+mt)))+(lsb*(ms+(ms+mt))+(lsb*(ms+(ms+mt))+(lsb*(ms+(ms+mt))+(lsb*(ms+(ms+mt)))+(lsb*(ms+(ms+mt)))+(lsb*(ms+(ms+mt))$ $lsa \star (mb + (mf + 2 \star (ms + mt))))) \star sin(q2) \star (q2d)^{(2)} + (lta \star mb \star sin(q3) \star (q3d)^{(2)} + (ltb \star mb \star sin(q3) \star (q3d)^{(2)}) + (lta \star mb \star sin(q3) \star$ $q3)*(q3d)^{(2)}+(1ta*mf*sin(q3)*(q3d)^{(2)}+(1tb*mf*sin(q3)*(q3d)^{(2)}+(1ta*ms*sin(q3))*(q3d)^{(2)}+(1ta*mf*sin(q3))*(q3d)^{(2)}+$ $* (q3d) ^(2) + (1tb*ms*sin(q3) * (q3d) ^(2) + (2*lta*mt*sin(q3) * (q3d) ^(2) + (1tb*mt*sin(q3) * (q3d) ^(2) + ($ $(q3d) \, {}^{\wedge}(2) \, + \, (1ba * mb * sin \, (q4) * \, (q4d) \, {}^{\wedge}(2) \, + \, (-1 * lta * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (-1 * ltb * mf * sin \, (q5) * \, (q5d) \, {}^{\wedge}(2) \, + \, (q5d) \, {}^{\wedge}(2$ $q5) * (q5d) ^(2) + (-1*lta*ms*sin(q5)*(q5d)^(2) + (-1*ltb*ms*sin(q5)*(q5d)^(2) + (-1*ltb*m$ $mt*sin(q5)*(q5d)^{(2)}+(-1*lsa*mf*sin(q6)*(q6d)^{(2)}+(-1*lsb*mf*sin(q6)*(q6d)^{(2)}+(-1*ls$ $+ (-1 * lfd * mf * sin (q7) * (q7d) ^ (2) + (-1 * lfc * mb * cos (q1) * q1dd + (-1 * lfd * mb * cos (q1) * q1dd + (-2 *$ *1fc*mf*cos(q1)*q1dd+(-1*1fd*mf*cos(q1)*q1dd+(-2*1fc*ms*cos(q1)*q1dd+(-2*1fd*ms*)) $\cos(q1)*q1dd+(-2*lfc*mt*cos(q1)*q1dd+(-2*lfd*mt*cos(q1)*q1dd+(lfe*mb*sin(q1)*q1d+(lfe*mb*sin(q1)*q1d+(lfe*mb*sin(q1)*q1d+(lfe*mb*sin(q1)*q1d+(lfe*mb*sin(q1)*q1d+(lfe*mb*sin(q1)*$ + (1fa*mf*sin(q1)*q1dd+(1fe*mf*sin(q1)*q1dd+(2*lfe*ms*sin(q1)*q1dd+(2*lfe*mt*sin(q1)*q1d+(2*lfe*mt*sin(q1)*q1d+(2*lfe*mt*sin(q1)*q1d+(2*lfe*mt*sin(q1)*q1d+(2* $\tt{q1)} * \tt{q1dd} + (-1*lsa*mb*cos(q2)*q2dd + (-1*lsb*mb*cos(q2)*q2dd + (-1*lsa*mf*cos(q2)*q2dd + (-1*lsa*mf*cos(q2)*q2d$ (-1 * lsb * mf * cos (q2) * q2dd + (-2 * lsa * ms * cos (q2) * q2dd + (-1 * lsb * ms * cos (q2) * q2dd + (-2 * lsa * msmt*cos(q2)*q2dd+(-2*lsb*mt*cos(q2)*q2dd+(-1*lta*mb*cos(q3)*q3dd+(-1*ltb*mb*cos(q3)*q3d+(-1*ltb*mb*cos(q3)*q3d+(-1*ltb*mb*cos(q3)*q3d+(-1*ltb*mb*cos(q3)*q3d+(-1*ltb*mb*cos(q)*q3dd+(-1*lta*mf*cos(q3)*q3dd+(-1*ltb*mf*cos(q3)*q3dd+(-1*lta*ms*cos(q3)*q31*ltb*ms*cos(q3)*q3dd+(-2*lta*mt*cos(q3)*q3dd+(-1*ltb*mt*cos(q3)*q3dd+(-1*lba*mb*) $\cos(q4)*q4dd+(1ta*mf*\cos(q5)*q5dd+(1tb*mf*\cos(q5)*q5dd+(1ta*ms*\cos(q5)*q5dd+(1tb*mf*\cos(q5))*q5dd+(1tb*mf*o(q5))*q$ ms * cos (q5) * q5dd + (1tb * mt * cos (q5) * q5dd + (1sa * mf * cos (q6) * q6dd + (1sb * mflsb*ms*cos(q6)*q6dd+(lfd*mf*cos(q7)*q7dd+(lfa*mf*sin(q7)*q7dd+(-1*lfe*mf*sin

dyn9 = HurGlobalELEquation[[9]]; HurToJulia[dyn9]

(-1*lambda2+(-1*lambda3+(-1*lambda5+(g*mb+(2*g*mf+(2*g*ms+(2*g*mt+(-1*((lfd*(mb+(mf+(a*g*mb++2*(ms+mt)))+1fc*(mb+2*(mf+(ms+mt))))*cos(q1)+-1*(1fa*mf+1fe*(mb+(mf+2*(ms+mt)))) $)*\sin (q1))*(q1d)^{(2)}+(-1*(1sb*(mb+(mf+(ms+2*mt)))+1sa*(mb+(mf+2*(ms+mt))))*cos(mb+(mf+2*(ms+mt))))*(mf+2*(ms+mt))))*(mf+2*(ms+mt)))$ $q2) * (q2d) ^(2) + (-1*lta*mb*cos(q3)*(q3d)^(2) + (-1*ltb*mb*cos(q3)*(q3d)^(2) + (-1*lta*mb*cos(q3)*(q3d)^(2) + (-1*lta*mb*cos(q3)*(q3)*(q3d)^(2) + (-1*lta*mb*cos(q3)*(q3d)^(2) + (-1*$ $mf*cos(q3)*(q3d)^{(2)}+(-1*ltb*mf*cos(q3)*(q3d)^{(2)}+(-1*lta*ms*cos(q3)*(q3d)^{(2)}+(-1*lt$ $1*ltb*ms*cos(q3)*(q3d)^(2)+(-2*lta*mt*cos(q3)*(q3d)^(2)+(-1*ltb*mt*cos(q3)*(q3d)^(2)+(-1*ltb*mt*cos(q3))^(q3d)^($ $(2) + (-1*1ba*mb*cos(q4)*(q4d)^{(2)} + (1ta*mf*cos(q5)*(q5d)^{(2)} + (1tb*mf*cos(q5)*(q5d)^{(2)})$ $1 f d \star m f \star \cos \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(1 f a \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7 d\right) \wedge \left(2\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) \star \left(q 7\right) + \left(-1 \star 1 f e \star m f \star \cos \left(q 7\right) + \left(-1 \star 1 f e \star m f \star \sin \left(q 7\right) + \left(-1 \star 1 f e \star m f + \left(q 7\right) + \left(-1 \star 1 f e \star m f + \left(q 7\right) + \left(-1 \star 1 f e \star m f + \left(q 7\right) + \left(q 7\right) + \left(-1 \star 1 f e \star m f + \left(q 7\right) + \left(q$ -1 * lfe * mb * cos (q1) * q1dd + (-1 * lfa * mf * cos (q1) * q1dd + (-1 * lfe * mf * cos (q1) * q1dd + (-2 * lfe * ms + cos (q1) * q1dd + (-2 * lfe * ms $*\cos(q1)*q1dd+(-2*lfe*mt*\cos(q1)*q1dd+(-1*lfc*mb*\sin(q1)*q1dd+(-1*lfd*mb*\sin(q1)*q1dd+(-1*lfd*mb*\sin(q1)*q1dd+(-1*lfd*mb*add+(-1*lfd*m$ q1dd + (-2*1fc*mf*sin(q1)*q1dd + (-1*1fd*mf*sin(q1)*q1dd + (-2*1fc*ms*sin(q1)*q1dd + (-2*1fc*ms*sin(q1)*q1d + (-2*1fc*ms*sin(q1)*q1d + (-2*1fc*ms*sin(q1)*q1d + (-2*1fc*ms*s1fd*ms*sin(q1)*q1dd+(-2*1fc*mt*sin(q1)*q1dd+(-2*1fd*mt*sin(q1)*q1dd+(-1*1sa*mb*) $\sin(q2)*q2dd+(-1*lsb*mb*sin(q2)*q2dd+(-1*lsa*mf*sin(q2)*q2dd+(-1*lsb*mf*sin(q2$ q2dd + (-2*lsa*ms*sin(q2)*q2dd + (-1*lsb*ms*sin(q2)*q2dd + (-2*lsa*mt*sin(q2)*q2dd + (-2*lsa* $\sin(q3)*q3dd+(-1*ltb*mf*sin(q3)*q3dd+(-1*lta*ms*sin(q3)*q3dd+(-1*ltb*ms*sin(q3$ q3dd + (-2*lta*mt*sin(q3)*q3dd + (-1*ltb*mt*sin(q3)*q3dd + (-1*lba*mb*sin(q4)*q4dd + (lta*mt*sin(q4)*q4dd + (lta*mt*sin(q4)*q4d + (lta*mt*sin(q4)*q4d + (lta*mt*sin(q4)*q4d + (lta*m*mf*sin(q5)*q5dd+(ltb*mf*sin(q5)*q5dd+(lta*ms*sin(q5)*q5dd+(ltb*ms*sin(q5)*q5dd+(1 + mt * sin(q5) * q5dd + (1sa * mf * sin(q6) * q6dd + (1sb * mf * sin(q6) * q6dd + (1sb * ms * sin(q6) * q6dd + (1sb * mf * sin(q+(-1*1fa*mf*cos(q7)*q7dd+(1fe*mf*cos(q7)*q7dd+(1fd*mf*sin(q7)*q7dd+(mb*q9dd+(2*mf*cos(q7)*q7d+(2*mf*cos(q7)*q7d+(2*mf*cos(q7)*q7d+(2*mf*cos(q7)*q7d+(2*mf*cos(q7)*q7d+(2*mf*cos(q7)*q7d+(2*mf*cos(q7)*q7d+(2*mf*cos(q7)*q7d+(2*m

HurUnifyTriadsCoord[ToeST, rf0] // MatrixForm D[%[[2]],t]

```
(lfa + lfb) Cos [q1[t]] + q8[t]
q9[t] + (lfa + lfb) Sin[q1[t]]
             rf0
```

```
(1fa + 1fb) Cos[q1[t]] q1'[t] + q9'[t]
```

ToeSWLength = HurUnifyTriadsCoord[ToeSW, rf0][[1]] HurToJulia[ToeSWLength]

```
-1fe Cos [q1[t]] + 1fe Cos [q7[t]] + q8[t] -
        (lfc + lfd) Sin[q1[t]] - (lsa + lsb) Sin[q2[t]] - (lta + ltb) Sin[q3[t]] +
        (lta + ltb) Sin[q5[t]] + (lsa + lsb) Sin[q6[t]] + (lfc + lfd) Sin[q7[t]]
(-1*lfe*cos(q1) + (lfe*cos(q7) + (q8 + (-1*(lfc + lfd) *sin(q1) + (-1*(lsa + lsb) *sin(q2) + (-1*(lsa + lsb) *sin(q2) + (-1*(lsa + lsb) *sin(q3) + (-1*(lsa + lsa + lsb) *sin(q3) + (-1*(lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa + lsa + (-1*(lsa + lsa + (-1*(lsa + lsa + lsa + lsa + lsa + lsa +
             lta+ltb)*sin(q3)+((lta+ltb)*sin(q5)+((lsa+lsb)*sin(q6)+(lfc+lfd)*sin(q7)))))))))
```

ToeSWHeight = HurUnifyTriadsCoord[ToeSW, rf0][[2]] HurToJulia[ToeSWHeight]

```
(1fc + 1fd) Cos[q1[t]] + (1sa + 1sb) Cos[q2[t]] +
       (lta + ltb) Cos[q3[t]] - (lta + ltb) Cos[q5[t]] - (lsa + lsb) Cos[q6[t]] -
       (1fc + 1fd) Cos[q7[t]] + q9[t] - 1fe Sin[q1[t]] + 1fe Sin[q7[t]]
((1fc+1fd)*cos(q1)+((1sa+1sb)*cos(q2)+((1ta+1tb)*cos(q3)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1t
              (lsa+lsb)*cos(q6)+(-1*(lfc+lfd)*cos(q7)+(q9+(-1*lfe*sin(q1)+lfe*sin(q7)))))))))
```

HeelSWLength = HurUnifyTriadsCoord[HeelSW, rf0][[1]] HurToJulia[HeelSWLength]

```
-1 fe \ Cos \ [ \ q1 \ [ \ t \ ] \ ] \ - \ \left( 1 fa + 1 fb \right) \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ - 1 fe \ Cos \ [ \ q7 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + q8 \ [ \ t \ ] \ + 
              (lfc + lfd) Sin[q1[t]] - (lsa + lsb) Sin[q2[t]] - (lta + ltb) Sin[q3[t]] +
                (lta + ltb) Sin[q5[t]] + (lsa + lsb) Sin[q6[t]] + (lfc + lfd) Sin[q7[t]]
   (-1*lfe*cos(q1) + (-1*(lfa+lfb)*cos(q7) + (lfe*cos(q7) + (q8+(-1*(lfc+lfd)*sin(q1) + (-1*(lfc+lfd)*sin(q1) + (-1*(lfc+lfd)*s
                          lsa+lsb)*sin(q2)+(-1*(lta+ltb)*sin(q3)+((lta+ltb)*sin(q5)+((lsa+lsb)*sin(q6)+(lfc))
                        +lfd)*sin(q7))))))))))
```

HeelSWHeight = HurUnifyTriadsCoord[HeelSW, rf0][[2]] HurToJulia[HeelSWHeight]

```
(1fc + 1fd) Cos[q1[t]] + (1sa + 1sb) Cos[q2[t]] + (1ta + 1tb) Cos[q3[t]] -
      (1ta + 1tb) Cos[q5[t]] - (1sa + 1sb) Cos[q6[t]] - (1fc + 1fd) Cos[q7[t]] +
    q9[t] - lfe Sin[q1[t]] - (lfa + lfb) Sin[q7[t]] + lfe Sin[q7[t]]
((1fc+1fd)*cos(q1)+((1sa+1sb)*cos(q2)+((1ta+1tb)*cos(q3)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1ta+1tb)*cos(q5)+(-1*(1t
             (1sa+1sb)*cos(q6)+(-1*(1fc+1fd)*cos(q7)+(q9+(-1*1fe*sin(q1)+(-1*(1fa+1fb)*sin(q7))+(-1*(1fa+1fb)*sin(q7)))
            +lfe*sin(q7))))))))))
```

HeelSWVelHorizontal = D[HurUnifyTriadsCoord[HeelSW, rf0][[1]], t] HurToJulia[HeelSWVelHorizontal]

```
-(1fc + 1fd) \cos[q1[t]] q1'[t] + 1fe \sin[q1[t]] q1'[t] - (1sa + 1sb) \cos[q2[t]] q2'[t] - (1sa + 1sb) ca(t) q2'[t] - (1
                     (lta + ltb) Cos[q3[t]] q3'[t] + (lta + ltb) Cos[q5[t]] q5'[t] +
                   (lsa + lsb) Cos[q6[t]] q6'[t] + (lfc + lfd) Cos[q7[t]] q7'[t] +
                 (lfa + lfb) Sin[q7[t]] q7'[t] - lfe Sin[q7[t]] q7'[t] + q8'[t]
 (-1*(1fc+1fd)*cos(q1)*q1d+(1fe*sin(q1)*q1d+(-1*(1sa+1sb)*cos(q2)*q2d+(-1*(1ta+1tb)*cos(q2)*q2d+(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(-1*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1tb)*(1ta+1t
                             \cos(q3)*q3d+((1ta+1tb)*\cos(q5)*q5d+((1sa+1sb)*\cos(q6)*q6d+((1fc+1fd)*\cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*cos(q7)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sb)*q7d+((1sa+1sa)*q7d+((1sa+1sa)*q7d+((1sa+1sa)*q7d+((1sa+1sa)*q7d+((1sa+1sa)*q7d+((1sa+1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+((1sa)*q7d+(
                               ((1fa+1fb)*sin(q7)*q7d+(-1*1fe*sin(q7)*q7d+q8d)))))))))
```

HeelSWVelVertical = D[HurUnifyTriadsCoord[HeelSW, rf0][[2]], t] HurToJulia[HeelSWVelVertical]

```
-1 fe \ Cos \ [q1[t]] \ q1'[t] \ - \ \left(1 fc + 1 fd\right) \ Sin \ [q1[t]] \ q1'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ - \ \left(1 sa + 1 sb\right) \ Sin \ [q2[t]] \ q2'[t] \ q2'[t]
                    (lta + ltb) Sin[q3[t]] q3'[t] + (lta + ltb) Sin[q5[t]] q5'[t] +
                  (1sa + 1sb) Sin[q6[t]] q6'[t] - (1fa + 1fb) Cos[q7[t]] q7'[t] +
              lfe Cos [q7[t]] q7'[t] + (lfc + lfd) Sin [q7[t]] q7'[t] + q9'[t]
  (-1 * lfe * cos (q1) * q1d + (-1 * (lfc + lfd) * sin (q1) * q1d + (-1 * (lsa + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * sin (q2) * q2d + (-1 * (lta + lsb) * q2d + 
                            1tb) *\sin(q3)*q3d+((1ta+1tb)*\sin(q5)*q5d+((1sa+1sb)*\sin(q6)*q6d+(-1*(1fa+1fb)*\cos(q5)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*\sin(q6)*q5d+((1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o(1sa+1sb)*o
                            q7)*q7d+(1fe*cos(q7)*q7d+((1fc+1fd)*sin(q7)*q7d+q9d)))))))))
```

HurSaveData["data1.m", "HolonomicConst", "AConstr", "ToeST", "HeelST", "FootSTCOM", "AnkleST", "ShankSTCOM", "KneeST", "ThighSTCOM", "Hip", "TorsoCOM", "ThighSWCOM", "KneeSW", "ShankSWCOM", "AnkleSW", "ToeSW", "HeelSW", "FootSWCOM", "dyn1", "dyn2", "dyn3", "dyn4", "dyn5", "dyn6", "dyn7", "dyn8", "dyn9", "ToeSWLength", "ToeSWHeight", "HeelSWLength", "HeelSWHeight", "HeelSWVelHorizontal", "HeelSWVelVertical", "JacToeSW", "JacHeelSW", "impDynConst1", "impDynConst2", "impDynConst3", "impDynConst4"]

HurGlobalNonConservativeForces // MatrixForm

```
-tau1 - lambda3 (lfa + lfb) Cos[q1[t]] + lambda5 (- lfe Cos[q1[t]] - (lfc + lfd) Sin[q1
                                                 tau1 - tau2 - lambda4 (lsa + lsb) Cos[q2[t]] - lambda
                                                 tau2 - tau3 - lambda4 (lta + ltb) Cos[q3[t]] - lambda
                                                                                         tau3 - tau4
                                                 tau4 - tau5 + lambda4 (lta + ltb) Cos[q5[t]] + lambda
                                                 tau5 - tau6 + lambda4 (lsa + lsb) Cos[q6[t]] + lambda
tau6 + lambda5 \left(-\left(lfa + lfb\right) Cos[q7[t]] + lfe Cos[q7[t]] + \left(lfc + lfd\right) Sin[q7[t]]\right) + lambda4 \left(-\left(lfa + lfb\right) Cos[q7[t]]\right)
                                                                                     lambda1 + lambda4
                                                                               lambda2 + lambda3 + lambda5
```

```
Transpose [AConstr].
   HurList2Column[{lambda1, lambda2, lambda3, lambda4, lambda5}] // MatrixForm
  0 0 - (lfa + lfb) Cos[q1[t]]
                                                            - (lfc + lfd) Cos[q1[t]] + lfe Sin[q1[t]]
  0 0
                                                                       - (lsa + lsb) Cos[q2[t]]
                        0
  0 0
                        0
                                                                       - (lta + ltb) Cos[q3[t]]
  0 0
                        а
                                                                                       0
                                                                         (lta + ltb) Cos[q5[t]]
  0 0
                        a
  0 0
                        а
                                                                         (lsa + lsb) Cos[q6[t]]
                                            (lfc + lfd) Cos[q7[t]] + (lfa + lfb) Sin[q7[t]] - lfe Sin[q7[t]]
  0 0
                        0
  1 0
  0 1
                                                                                       0
                        1
           -1ambda3 (lfa + lfb) Cos[q1[t]] + lambda5 (-1fe Cos[q1[t]] - (lfc + lfd) Sin[q1[t]]) -
                                                              -lambda4 (lsa + lsb) Cos[q2[t]] - lambda5 (lsa + l
                                                              -lambda4 (lta + ltb) Cos[q3[t]] - lambda5 (lta + l
                                                               lambda4 (lta + ltb) Cos[q5[t]] + lambda5 (lta + l.)
                                                               lambda4 (lsa + lsb) Cos[q6[t]] + lambda5 (lsa + l:
  lambda5 \left(-\left(1 \operatorname{fa} + 1 \operatorname{fb}\right) \operatorname{Cos}\left[q 7 \left[t\right]\right] + 1 \operatorname{fe} \operatorname{Cos}\left[q 7 \left[t\right]\right] + \left(1 \operatorname{fc} + 1 \operatorname{fd}\right) \operatorname{Sin}\left[q 7 \left[t\right]\right]\right) + 1 \operatorname{ambda4}\left(\left(1 \operatorname{fc} + 1 \operatorname{fd}\right) \operatorname{Sin}\left[q 7 \left[t\right]\right]\right) + 1 \operatorname{ambda4}\left(\left(1 \operatorname{fc} + 1 \operatorname{fd}\right) \operatorname{Sin}\left[q 7 \left[t\right]\right]\right) + 1 \operatorname{ambda4}\left(\left(1 \operatorname{fc} + 1 \operatorname{fd}\right) \operatorname{Sin}\left[q 7 \left[t\right]\right]\right)\right)
                                                                                              lambda1 + lambda4
                                                                                        lambda2 + lambda3 + lambda5
JacToeSW = HurGetJacobian[ToeSW, rf7, rf0][[1;; 2, ;;]];
JacHeelSW = HurGetJacobian[HeelSW, rf7, rf0][[1;; 2, ;;]];
JacToeSW // MatrixForm
JacHeelSW // MatrixForm
  -(1fc + 1fd) \cos[q1[t]] + 1fe \sin[q1[t]] - (1sa + 1sb) \cos[q2[t]] - (1ta + 1tb) \cos[q3[t]]
 -1 fe Cos[q1[t]] - (1 fc + 1 fd) Sin[q1[t]] - (1 sa + 1 sb) Sin[q2[t]] - (1 ta + 1 tb) Sin[q3[t]]
 (-(1fc+1fd) \cos[q1[t]]+1fe \sin[q1[t]] - (1sa+1sb) \cos[q2[t]] - (1ta+1tb) \cos[q3[t]]
\left(-1 \text{fe Cos}\left[q1[t]\right] - \left(1 \text{fc} + 1 \text{fd}\right) \text{Sin}\left[q1[t]\right] - \left(1 \text{sa} + 1 \text{sb}\right) \text{Sin}\left[q2[t]\right] - \left(1 \text{ta} + 1 \text{tb}\right) \text{Sin}\left[q3[t]\right]
impDynConst1 =
   ArrayFlatten[{{HurGlobalMMatrix, -Transpose[JacToeSW]}}].HurList2Column[
        {q1dp, q2dp, q3dp, q4dp, q5dp, q6dp, q7dp, q8dp, q9dp, FimpToeX, FimpToeY}] -
    HurGlobalMMatrix.HurList2Column[{q1'[t], q2'[t], q3'[t],
         q4'[t], q5'[t], q6'[t], q7'[t], q8'[t], q9'[t]}];
impDynConst2 =
   JacToeSW.HurList2Column[{q1dp, q2dp, q3dp, q4dp, q5dp, q6dp, q7dp, q8dp, q9dp}];
impDvnConst3 =
   ArrayFlatten[{{HurGlobalMMatrix, -Transpose[JacHeelSW]}}].HurList2Column[
        {q1dp, q2dp, q3dp, q4dp, q5dp, q6dp, q7dp, q8dp, q9dp, FimpHeelX, FimpHeelY}] -
    HurGlobalMMatrix.HurList2Column[{q1'[t], q2'[t], q3'[t],
         q4'[t], q5'[t], q6'[t], q7'[t], q8'[t], q9'[t]}];
impDynConst4 =
   JacHeelSW.HurList2Column[{q1dp, q2dp, q3dp, q4dp, q5dp, q6dp, q7dp, q8dp, q9dp}];
```

Transpose[AConstr] // MatrixForm

HurToJulia[impDynConst1[[9, 1]]]

```
(-1*FimpToeY+((mb+2*(mf+(ms+mt)))*q9dp+(q1dp*(-1*(lfa*mf+lfe*(mb+(mf+2*(ms+mt)))))*q9dp+(q1dp*(-1*fimpToeY+(mb+(mf+2*(ms+mt))))))
                                 \cos{(q1)} + -1 \star (1 + d \star (mb + (mf + 2 \star (ms + mt))) + 1 + f c \star (mb + 2 \star (mf + (ms + mt)))) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) + (-1 \star (1 + mt)) + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star (1 + mt)) \\ \star \sin{(q1)} + (-1 \star
                            mb + (mf + (ms + 2 * mt))) + lsa * (mb + (mf + 2 * (ms + mt)))) * q2dp * sin(q2) + (-1 * (ltb * (mb + (mf + (ms + mt))))) * q2dp * sin(q2)) + (-1 * (ltb * (mb + (mf + (ms + mt))))) * q2dp * sin(q2)) + (-1 * (ltb * (mb + (mf + (ms + mt))))) * q2dp * sin(q2)) + (-1 * (ltb * (mb + (mf + (ms + mt))))) * q2dp * sin(q2)) * q2dp * sin(q2) * q2dp * sin(q2)) * q2dp * sin(q2)) * q2dp * sin(q2) * q2d
                               )\ )\ )+lta*(mb+(mf+(ms+2*mt))))*q3dp*sin(q3)+(-1*lba*mb*q4dp*sin(q4)+((lta*(mf+ms)+mf+ms))))
                               ltb*(mf+(ms+mt)))*q5dp*sin(q5)+((lsa*mf+lsb*(mf+ms))*q6dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms)))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms))*q5dp*sin(q6)+(mf*q7dp*((-1*mf+ms))*q5dp*sin(q6)+(m
                               1fa+1fe)*cos(q7)+1fd*sin(q7))+(-1*(-1*(1fa*mf+1fe*(mb+(mf+2*(ms+mt))))*cos(q1)+-1
                                 \star \; (\texttt{lfd} \star \; (\texttt{mb} + (\texttt{mf} + 2 \star \; (\texttt{ms} + \texttt{mt}) \;) \;) \; + \texttt{lfc} \star \; (\texttt{mb} + 2 \star \; (\texttt{mf} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{sin} \; (\texttt{q1}) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{mf} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{sin} \; (\texttt{q1}) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{mf} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{mf} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\; (\texttt{lsb} \star \; (\texttt{mb} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{q1d} + \; (\texttt{lsb} + (\texttt{ms} + (\texttt{ms} + (\texttt{ms} + \texttt{mt}) \;) \;) \; \star \\ \texttt{
                            ms+2*mt)))+lsa*(mb+(mf+2*(ms+mt))))*sin(q2)*q2d+((ltb*(mb+(mf+(ms+mt)))+lta*(mb+(ms+mt)))+lta*(mb+(ms+mt)))
                                    (mf + (ms + 2*mt))))*sin(q3)*q3d + (lba*mb*sin(q4)*q4d + (-1*(lta*(mf+ms)+ltb*(mf+(ms+mt)))))*sin(q3)*q3d + (lba*mb*sin(q4)*q4d + (-1*(lta*(mf+ms)+ltb*(mf+(ms+mt))))))*sin(q3)*q3d + (lba*mb*sin(q4)*q4d + (-1*(lta*(mf+ms)+ltb*(mf+(ms+mt))))))*sin(q3)*q3d + (lba*mb*sin(q4)*q4d + (-1*(lta*(mf+ms)+ltb*(mf+(ms+mt)))))))*sin(q3)*q3d + (lba*mb*sin(q4)*q4d + (-1*(lta*(mf+ms)+ltb*(mf+(ms+mt))))))))*sin(q4)*q4d + (lba*mb*sin(q4)*q4d + (lba*mb*s
                                 )\ ) * sin(q5) * q5d + (-1*(lsa*mf + lsb*(mf + ms)) * sin(q6) * q6d + (-1*mf*((-1*lfa + lfe) * cos(q7) + (-1*mf*((-1*mf*((-1*lfa + lfe) * cos(q7) + (-1*mf*((-1*mf*((-1*lfa + lfe) * cos(q7) + (-1*mf*((-1*mf*((-1*lfa + lfe) * cos(q7) + (-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((-1*mf*((
                               1fd*sin(q7))*q7d+-1*(mb+2*(mf+(ms+mt)))*q9d)))))))))))))))))))
```

HurToJulia[impDynConst2[[2, 1]]]

```
(q9dp + (q1dp * (-1 * lfe * cos (q1) + -1 * (lfc + lfd) * sin (q1)) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsb) * q2dp * sin (q2) + (-1 * (lsa + lsa + lsa + lsa + lsa +
                     \cos(q7) + (1fc+1fd) * \sin(q7)))))))
```

HurToJulia[impDynConst3[[9, 1]]]

```
(-1*FimpHeelY+((mb+2*(mf+(ms+mt)))*q9dp+(q1dp*(-1*(lfa*mf+lfe*(mb+(mf+2*(ms+mt)))))*
                                    \cos{(q1)} + -1 \star (1 + fd \star (mb + (mf + 2 \star (ms + mt))) + 1 + fc \star (mb + 2 \star (mf + (ms + mt)))) \\ \star \sin{(q1)} + (-1 \star (1sb \star (mb + 2 \star (ms + mt)))) \\ \star \sin{(q1)} + (-1 \star (1sb \star (mb + 2 \star (ms + mt)))) \\ \star \sin{(q1)} + (-1 \star (1sb \star (mb + 2 \star (ms + mt)))) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star \sin{(q1)} + (-1 \star (ms + mt)) \\ \star
                               mb + (mf + (ms + 2 * mt))) + lsa * (mb + (mf + 2 * (ms + mt)))) * q2dp * sin(q2) + (-1 * (ltb * (mb + (mf + (ms + mt))))) * q2dp * sin(q2)) + (-1 * (ltb * (mb + (mf + (ms + mt))))) * q2dp * sin(q2)) + (-1 * (ltb * (mb + (mf + (ms + mt))))) * q2dp * sin(q2)) * q2dp * sin(q2)) * q2dp * sin(q2) * q3dp * sin(q2)) * q3dp * sin(q2) * q3dp * sin(q2)) * q3dp * sin(q2) * q3dp * sin(q2) * q3dp * sin(q2)) * q3dp * sin(q2) * q3dp * sin(q2)) * q3dp * sin(q2) * q3dp * sin(q2) * q3dp * sin(q2) * q3dp * sin(q2)) * q3dp * sin(q2) * q3dp * q3dp * sin(q2) * q3d
                                 )\;)\;)+lta*\left(mb+\left(mf+\left(ms+2*mt\right)\right)\right))*q3dp*sin\left(q3\right)+\left(-1*lba*mb*q4dp*sin\left(q4\right)+\left(\left(lta*\left(mf+ms\right)+ms\right)+ms\right)\right))+lta*\left(mb+\left(mf+ms+2*mt\right)\right))
                                 1 \\ tb * (mf + (ms + mt))) * q5 \\ dp * sin (q5) + ((1sa * mf + 1sb * (mf + ms)) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6 \\ dp * sin (q6) + (mf * q7 \\ dp * ((-1* mf + ms))) * q6
                                 1fa+1fe)*cos(q7)+1fd*sin(q7))+(-1*(-1*(1fa*mf+1fe*(mb+(mf+2*(ms+mt))))*cos(q1)+-1
                                    *\left(1 f d * \left(m b + \left(m f + 2 * \left(m s + m t\right)\right)\right) + 1 f c * \left(m b + 2 * \left(m f + \left(m s + m t\right)\right)\right)\right) \\ * sin\left(q 1\right)\right) * q 1 d + \left(\left(1 s b * \left(m b + \left(m f + \left(m s + m t\right)\right)\right)\right) + 1 f c * \left(m b + 2 * \left(m f + \left(m s + m t\right)\right)\right)\right) \\ * sin\left(q 1\right)\right) * q 1 d + \left(\left(1 s b * \left(m b + \left(m f + \left(m s + m t\right)\right)\right)\right) + 1 f c * \left(m f + 2 * \left(m f + \left(m s + m t\right)\right)\right)\right) \\ * sin\left(q 1\right)\right) * q 1 d + \left(\left(1 s b * \left(m f + \left(m f + \left(m s + m t\right)\right)\right)\right)\right) \\ * sin\left(q 1\right)\right) * q 1 d + \left(\left(1 s b * \left(m f + \left(m
                               ms+2*mt)))+lsa*(mb+(mf+2*(ms+mt))))*sin(q2)*q2d+((ltb*(mb+(mf+(ms+mt)))+lta*(mb+(ms+mt)))+lta*(mb+(ms+mt)))
                                      (\mathsf{mf} + (\mathsf{ms} + 2 \star \mathsf{mt}) \,) \,) \, \star \sin \, (\mathsf{q3}) \, \star \mathsf{q3d} + (\mathsf{1ba} \star \mathsf{mb} \star \sin \, (\mathsf{q4}) \, \star \mathsf{q4d} + (-1 \star \, (\mathsf{1ta} \star \, (\mathsf{mf} + \mathsf{ms}) \, + \mathsf{1tb} \star \, (\mathsf{mf} + \, (\mathsf{ms} + \mathsf{mt}) \, + \mathsf{ms}) 
                                 ) * sin(q5)*q5d+(-1*(lsa*mf+lsb*(mf+ms))*sin(q6)*q6d+(-1*mf*((-1*lfa+lfe)*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*cos(q7)+(-1*mf*((-1*lfa+lfe)))*
                                 1fd*sin(q7))*q7d+-1*(mb+2*(mf+(ms+mt)))*q9d)))))))))))))))))))
```

HurToJulia[impDynConst4[[2, 1]]]

```
(q9dp + (q1dp * (-1*lfe * cos (q1) + -1* (lfc + lfd) * sin (q1)) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsb) * q2dp * sin (q2) + (-1* (lsa + lsa + lsa + lsa + lsa + lsa + (-1* (lsa +
                                     lta+ltb)*q3dp*sin(q3)+((lta+ltb)*q5dp*sin(q5)+((lsa+lsb)*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*sin(q6)+q7dp*sin(q6)+q7dp*sin(q6)+q7dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*q6)+q7dp*q6(-1*(lsa+lsb))*q6dp*sin(q6)+q7dp*q6(-1*(lsa+lsb))*q6dp*sin
                                  1fa+1fb)*cos(q7)+(1fe*cos(q7)+(1fc+1fd)*sin(q7))))))))
```

HurGlobalMMatrix HurToJulia[%]

)*cos(q5)*q5d))

```
[\;(\text{Is}+(2\star 1\text{sa}\star 1\text{sb}\star (\text{mb}+(\text{ms}+2\star \text{mt})\;)+(\;(1\text{sb})^{\wedge}(2)\star (\text{mb}+(\text{ms}+2\star \text{mt})\;)+(1\text{sa})^{\wedge}(2)\star (\text{mb}+2\star (\text{ms}+\text{mt})\;))
            )) (1sa+1sb)*(1tb*(mb+(ms+mt))+1ta*(mb+(ms+2*mt)))*cos((q1+-1*q2))
            1/2*lb*(lsa+lsb)*mb*cos((q1+-1*q3))
            -1*(lsa+lsb)*(lta*ms+ltb*(ms+mt))*cos((q1+-1*q4))
            -1*lsb*(lsa+lsb)*ms*cos((q1+-1*q5));(lsa+lsb)*(ltb*(mb+(ms+mt))+lta*(mb+(ms+2*mt))
            )) * cos((q1+-1*q2))
            (\mathsf{It} + (2 * \mathsf{lta} * \mathsf{ltb} * (\mathsf{mb} + (\mathsf{ms} + \mathsf{mt})) + ((\mathsf{ltb}) \land (2) * (\mathsf{mb} + (\mathsf{ms} + \mathsf{mt})) + (\mathsf{lta}) \land (2) * (\mathsf{mb} + (\mathsf{ms} + 2 * \mathsf{mt}))))))
            1/2*lb*(lta+ltb)*mb*cos((q2+-1*q3))
            -1*(lta+ltb)*(lta*ms+ltb*(ms+mt))*cos((q2+-1*q4))
            -1*lsb*(lta+ltb)*ms*cos((q2+-1*q5));1/2*lb*(lsa+lsb)*mb*cos((q1+-1*q3))
           1/2*lb*(lta+ltb)*mb*cos((q2+-1*q3)) (Ib+1/4*(lb)^(2)*mb)
           0 \ 0; -1* (lsa+lsb) * (lta*ms+ltb* (ms+mt)) * cos ( (q1+-1*q4) )
            -1*(lta+ltb)*(lta*ms+ltb*(ms+mt))*cos((q2+-1*q4)) 0
             (It+((Ita)^{(2)}*ms+(2*Ita*Itb*ms+(Itb)^{(2)}*(ms+mt))))
            lsb*(lta+ltb)*ms*cos((q4+-1*q5));-1*lsb*(lsa+lsb)*ms*cos((q1+-1*q5))
            -1*1sb*(1ta+1tb)*ms*cos((q2+-1*q5)) 0
            lsb*(lta+ltb)*ms*cos((q4+-1*q5)) (Is+(lsb)^(2)*ms)]
HurGlobalCMatrix
HurToJulia[%]
 [0 (lsa+lsb)*(ltb*(mb+(ms+mt))+lta*(mb+(ms+2*mt)))*sin((q1+-1*q2))*q2d
            1/2*lb*(lsa+lsb)*mb*sin((q1+-1*q3))*q3d
            -1*(lsa+lsb)*(lta*ms+ltb*(ms+mt))*sin((q1+-1*q4))*q4d
           -1*lsb*(lsa+lsb)*ms*sin((q1+-1*q5))*q5d;-1*(lsa+lsb)*(ltb*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(ms+(ms+mt))+lta*(mb+(ms+mt))+lta*(ms+(ms+mt))+lta*(ms+(ms+mt))+l
           ms+2*mt)))*sin((q1+-1*q2))*q1d0 1/2*lb*(lta+ltb)*mb*sin((q2+-1*q3))*q3d
            -1*(lta+ltb)*(lta*ms+ltb*(ms+mt))*sin((q2+-1*q4))*q4d
           -1*lsb*(lta+ltb)*ms*sin((q2+-1*q3))*q5d;-1/2*lb*(lsa+lsb)*mb*sin((q1+-1*q3))*q1d
            -1/2*lb*(lta+ltb)*mb*sin((q2+-1*q3))*q2d 0 0
           0; (1sa+1sb) * (1ta*ms+1tb*(ms+mt)) * sin((q1+-1*q4)) * q1d
             (lta+ltb) * (lta*ms+ltb* (ms+mt) ) *sin((q2+-1*q4)) *q2d 0 0
            lsb*(lta+ltb)*ms*sin((q4+-1*q5))*q5d;lsb*(lsa+lsb)*ms*sin((q1+-1*q5))*q1d
            1 \\ \text{sb} \star (1 \\ \text{ta} + 1 \\ \text{tb}) \star \\ \text{ms} \star \\ \text{sin} ((q2 + -1 \star q5)) \star \\ \text{q2d} \ \emptyset \ -1 \\ \star \\ \text{lsb} \star (1 \\ \text{ta} + 1 \\ \text{tb}) \star \\ \text{ms} \star \\ \text{sin} ((q4 + -1 \star q5)) \star \\ \text{q4d} \ \emptyset]
HurGlobalGVector
HurToJulia[HurList2Column[%]]
 [-1*g*(1sb*(mb+(ms+2*mt))+lsa*(mb+2*(ms+mt)))*sin(q1);-1*g*(1tb*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(mb+(ms+mt))+lta*(ms+(ms+mt))+lta*(ms+(ms+mt))+lta*(ms+(ms+mt))+lta*(ms+(ms+mt))+lta*(ms+(ms+mt))+lta*(ms+(ms+
           mb + (ms + 2*mt)) *sin(q2); -1/2*g*lb*mb*sin(q3); g*(lta*ms+ltb*(ms+mt))*sin(q4); g*lsb*mb*sin(q4); 
           ms*sin(q5)
 JacFootSW = HurGetJacobian[FootSW, e, n];
 JacFootSW.HurList2Column[{q1'[t], q2'[t], q3'[t], q4'[t], q5'[t]}]
verticalVel = %[[2, 1]]
HurToJulia[verticalVel]
 (-1*(lsa+lsb)*sin(q1)*q1d+(-1*(lta+ltb)*sin(q2)*q2d+((lta+ltb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*q4d+(lsa+lsb)*sin(q4)*sin(q4)*q4d+(lsa+lsb)*sin(q4)
            ) *sin(q5) *q5d)))
 JacFootSW.HurList2Column[{q1'[t], q2'[t], q3'[t], q4'[t], q5'[t]}]
horizontalVel = %[[1, 1]]
HurToJulia[horizontalVel]
  (-1*(lsa+lsb)*cos(q1)*q1d+(-1*(lta+ltb)*cos(q2)*q2d+((lta+ltb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*q4d+(lsa+lsb)*cos(q4)*cos(q4)*cos(q4)*cos(q4)*cos(q
```

```
HurSaveData["data1.m", "FootST", "ShankSTCOM", "KneeST", "ThighSTCOM", "Hip", "TorsoCOM",
 "ThighSWCOM", "KneeSW", "ShankSWCOM", "FootSW", "dyn1", "dyn2", "dyn3", "dyn4", "dyn5",
 "stepLength", "stepHeight", "verticalVel", "horizontalVel", "JacFootSW", "invans"]
HurUnifyTriadsCoord[FootSW, n];
HurToJulia[%[[1]]]
(-1*(lsa+lsb)*sin(q1)+(-1*(lta+ltb)*sin(q2)+((lta+ltb)*sin(q4)+(lsa+lsb)*sin(q5))))
HurUnifyTriadsCoord[FootSW, n];
HurToJulia[%[[2]]]
((1sa+1sb)*cos(q1)+((1ta+1tb)*cos(q2)+(-1*(1ta+1tb)*cos(q4)+-1*(1sa+1sb)*cos(q5))))
HurUnifyTriadsCoord[KneeSW, n];
HurToJulia[%[[1]]]
(-1*(lsa+lsb)*sin(q1)+-1*(lta+ltb)*(sin(q2)+-1*sin(q4)))
HurUnifyTriadsCoord[KneeSW, n];
HurToJulia[%[[2]]]
((lsa+lsb)*cos(q1)+(lta+ltb)*(cos(q2)+-1*cos(q4)))
HurUnifyTriadsCoord[Hip, n];
HurToJulia[%[[1]]]
(-1*(lsa+lsb)*sin(q1)+-1*(lta+ltb)*sin(q2))
HurUnifyTriadsCoord[Hip, n];
HurToJulia[%[[2]]]
((lsa+lsb)*cos(q1)+(lta+ltb)*cos(q2))
HurUnifyTriadsCoord[TorsoCOM, n];
HurToJulia[%[[1]]]
(-1*(lsa+lsb)*sin(q1)+(-1*(lta+ltb)*sin(q2)+-1/2*lb*sin(q3)))
HurUnifyTriadsCoord[TorsoCOM, n];
HurToJulia[%[[2]]]
((lsa+lsb)*cos(q1)+((lta+ltb)*cos(q2)+1/2*lb*cos(q3)))
HurUnifyTriadsCoord[KneeST, n];
HurToJulia[%[[1]]]
-1*(lsa+lsb)*sin(q1)
HurUnifyTriadsCoord[KneeST, n];
HurToJulia[%[[2]]]
(lsa+lsb) *cos(q1)
Transpose[HurGetJacobian[Hip, c, n]].
  HurList2Column[{forcex, forcey, 0, 0, 0, 0}] // MatrixForm
HurToJulia[%[[2, 1]]]
HurGetJacobian[Hip, c, n] // MatrixForm
HurTurnOffSimplify[]
False
```

invans = HurELInverse[]

```
\{ q1''[t] \rightarrow
       -\left(\left(-\left(\left(\operatorname{Is}+\operatorname{lsb}^{2}\operatorname{ms}\right)\left(\cdots 1\cdots\right)-\left(\cdots 1\cdots\right)\left(\cdots 1\cdots+\cdots 1\cdots\right)\right)\left(\cdots 1\cdots\right)+\right.
                           (···1···) / ···1···) /
               \left(-\left(-\left(\left[\text{Ib}+\frac{1b^2\,\text{mb}}{4}\right)\,\left(\text{Is}+\text{1sb}^2\,\text{ms}\right)\,\left(\cdots\,1\cdots\right)\right.-\left.\cdots\,1\cdots\right)\right)\,\left(\cdots\,1\cdots\right)\,+\left.\left(\cdots\,1\cdots\right)\right]
                               (...1....) (....1....) + ....1....) , ....3..., q5"[t] → ....1....}}
large output
                             show less
                                                       show more
                                                                                   show all
                                                                                                          set size limit...
```

```
q5''[t] /. invans[[1]];
HurToJulia[%]
```

Whole body COM

COMWhole = Total[Table[HurGlobalCOMPos[[i]] * HurGlobalMass[[i]], {i, 2, Length[HurGlobalRF]}]] / Total[HurGlobalMass]

$$\begin{split} \frac{1}{\text{mb} + 2 \text{ ms} + 2 \text{ mt}} & \left(\left(\frac{\text{c2 lb}}{2} + \text{a2 (lsa} + \text{lsb)} + \text{b2 (lta} + \text{ltb)} \right) \text{ mb} + \\ & \text{a2 lsa ms} + \left(-\text{e2 lsb} + \text{a2 (lsa} + \text{lsb)} + \text{b2 (lta} + \text{ltb)} - \text{d2 (lta} + \text{ltb)} \right) \text{ ms} + \\ & \left(\text{a2 (lsa} + \text{lsb)} + \text{b2 lta} \right) \text{ mt} + \left(\text{a2 (lsa} + \text{lsb)} - \text{d2 ltb} + \text{b2 (lta} + \text{ltb)} \right) \text{ mt} \end{split}$$

Whole body COM linear momentum

LinearMomentumWholeBody =

D[HurUnifyTriadsCoord[COMWhole, n], t] * Total[HurGlobalMass] // Simplify; LinearMomentumWholeBody // MatrixForm

```
-(1sb (mb + ms + 2 mt) + 1sa (mb + 2 (ms + mt))) Cos[q1[t]] q1'[t] - (1tb (mb + ms + mt) + 1ta (mb + ms + mt))
-(lsb(mb+ms+2mt)+lsa(mb+2(ms+mt))) Sin[q1[t]] q1'[t] - (ltb(mb+ms+mt)+lta(mb+ms+mt))
```

Whole body COM linear momentum rate change

LinearMomentumRateWholeBody =

D[LinearMomentumWholeBody, t] * Total[HurGlobalMass] // Simplify; LinearMomentumRateWholeBody // MatrixForm

```
\left(\mathsf{mb} + 2 \; \left(\mathsf{ms} + \mathsf{mt}\right)\right) \; \left(\left(\mathsf{lsb} \; \left(\mathsf{mb} + \mathsf{ms} + 2 \; \mathsf{mt}\right) + \mathsf{lsa} \; \left(\mathsf{mb} + 2 \; \left(\mathsf{ms} + \mathsf{mt}\right)\right)\right) \; \mathsf{Sin}\left[\mathsf{q1}\left[\mathsf{t}\right]\right] \; \mathsf{q1'}\left[\mathsf{t}\right]^2 + \left(\mathsf{ltb} \; \left(\mathsf{mb} + \mathsf{ms}\right)\right) \; \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} + \mathsf{mb} + \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} + \mathsf{mb} + \mathsf{mb} \; \mathsf{mb} + \mathsf{mb} 
(mb + 2 (ms + mt)) (- (lsb (mb + ms + 2 mt) + lsa (mb + 2 (ms + mt))) Cos[q1[t]] q1'[t]^2 - (ltb (mb + ms + 2 mt)) (mb + 2 (ms + mt))
```

Whole body Angular Momentum

```
Table[HurCross[HurGlobalCOMPos[[i]] - COMWhole, HurGlobalLinearMomentum[[i]], n]+
  HurGlobalAngularMomentum[[i]], {i, 2, Length[HurGlobalRF]}]
HurUnifyTriadsCoord[Total[%], n] // Simplify
```

```
{a3 Is q1'[t] + n3 \left(\cdots 96 \cdots\right) + \frac{\cdots 1 \cdots}{\cdots 1 \cdots 2} + \frac{\cdots 1 \cdots}{\cdots 1 \cdots 2}
                      (2 \text{ lsa ltb ms}^3 \text{ Sin}[q1[t]] \text{ Sin}[q4[t]] q1'[t]) / (mb + 2 \text{ ms} + 2 \text{ mt})^2 +
                      (lsa ltb mb ms mt Sin[q1[t]] Sin[q4[t]] q1'[t]) / (mb + 2 ms + 2 mt) + +
                       (2 \text{ lsa lta ms}^2 \text{ mt Sin}[q1[t]] \text{ Sin}[q4[t]] q1'[t]) / (mb + 2 \text{ ms} + 2 \text{ mt})^2 +
                        \left(4\,	ext{lsa ltb ms}^2\,	ext{mt Sin}\left[	ext{q1}\left[	ext{t}
ight]
ight]\,	ext{Sin}\left[	ext{q4}\left[	ext{t}
ight]
ight]\,	ext{q1}'\left[	ext{t}
ight]
ight)\,\left/\,\left(	ext{mb}+2\,	ext{ms}+2\,	ext{mt}
ight)^2+
ight.
                       (2 \text{ lsa ltb ms mt}^2 \text{ Sin } [\text{q1}[\text{t}]] \text{ Sin } [\text{q4}[\text{t}]] \text{ q1}'[\text{t}]) / (\text{mb} + 2 \text{ ms} + 2 \text{ mt})^2 +
                       (lsa lsb mb ms^2 Sin[q1[t]] Sin[q5[t]] q1'[t]) / (mb + 2 ms + 2 mt)^2 + (mb + 2 ms + 2 ms + 2 mt)^2 + (mb + 2 ms + 2 
                      (2 lsa lsb ms^3 Sin[q1[t]] Sin[q5[t]] q1'[t]) / (mb + 2 ms + 2 mt)^2 +
                      (2 \text{ lsa lsb ms}^2 \text{ mt Sin}[q1[t]] \text{ Sin}[q5[t]] q1'[t]) / (mb + 2 \text{ ms} + 2 \text{ mt})^2),
    b3 It q2'[t] + n3 \left(\frac{1sa \cdots 7 \cdots 1 \cdots 1}{\left(\cdots 1 \cdots 1\right)^2} + \cdots 310 \cdots + \frac{\cdots 1 \cdots 1}{\left(\cdots 1 \cdots 1\right)^2}\right),
     1....
    e3 Is q5'[t] +
        n3 \left( \left( 1 \text{sa lsb mb ms}^2 \text{Cos} \left[ q1[t] \right] \text{Cos} \left[ q1[t] - q5[t] \right] \text{Cos} \left[ q5[t] \right] q1'[t] \right) / 
                           (mb + 2 ms + 2 mt)^2 +
                       (1sb^2 mb ms^2 Cos[q1[t]] Cos[q1[t] - q5[t]] Cos[q5[t]] q1'[t]) / (mb + 2 ms + 2 mt)^2 +
                      (2 lsa lsb ms^{3} Cos[q1[t]] Cos[q1[t] - q5[t]] Cos[q5[t]] q1'[t]) /
                           (mb + 2 ms + 2 mt)^2 + \dots 1036 \dots + (4 lsb^2 mb ms mt Sin[q5[t]]^2 q5'[t]) /
                          (mb + 2 ms + 2 mt)^2 + \frac{61sb^2 ms^2 mt Sin[q5[t]]^2 q5'[t]}{41sb^2 ms mt^2 Sin[q5[t]]^2 q5'[t]}
                                                                                                                                                                                                       (mb+2ms+2mt)^2
                                                                                                               (mb+2 ms+2 mt)^2
large output
                                                 show less
                                                                                                                                            show all
                                                                                                                                                                                   set size limit...
                                                                                            show more
```

```
\left\{\text{0,0,} \ \frac{1}{\text{2} \ \left(\text{mb} + \text{2} \ \left(\text{ms} + \text{mt}\right)\right.\right)}\right.
                    (2 \text{ lsb ms } (1 \text{tb } (\text{mb} + \text{ms} + \text{mt}) + 1 \text{ta } (\text{mb} + \text{ms} + 2 \text{ mt})) \text{ Cos} [q1[t] - q2[t]] + 1 \text{b lsb mb ms}
                                                                     \cos [q1[t] - q3[t]] + 2 (Is mb + 2 Is ms + 1sb^2 mb ms + 1sb^2 ms^2 + 2 Is mt + 2 1sb^2 ms mt - 1sb^2 ms^2 + 2 Is mt + 2 1sb^2 ms mt - 1sb^2 ms^2 + 2 Is mt 
                                                                                     | 1sb \, ms \, \left( 1ta \, ms \, + \, 1tb \, \left( ms \, + \, mt \right) \, \right) \, Cos \, [\, q1 \, [\, t\,] \, - \, q4 \, [\, t\,] \, ] \, - \, 1sb^2 \, ms^2 \, Cos \, [\, q1 \, [\, t\,] \, - \, q5 \, [\, t\,] \, ] \, \right) \, ) 
                                           q1'[t] + (2 lsb ms (ltb (mb + ms + mt) + lta (mb + ms + 2 mt)) Cos[q1[t] - q2[t]] +
                                                           1b mb (lta ms + ltb (ms + mt)) Cos[q2[t] - q3[t]] +
                                                           2 (It mb + 2 It ms + 1ta<sup>2</sup> mb ms + 2 1ta 1tb mb ms + 1tb<sup>2</sup> mb ms + 1ta<sup>2</sup> ms<sup>2</sup> +
                                                                                    2 lta ltb \mathrm{ms}^2 + ltb<sup>2</sup> \mathrm{ms}^2 + 2 It \mathrm{mt} + ltb<sup>2</sup> \mathrm{mb} \mathrm{mt} + 2 lta<sup>2</sup> \mathrm{ms} \mathrm{mt} + 2 lta ltb \mathrm{ms} \mathrm{mt} +
                                                                                    2 \text{ ltb}^2 \text{ ms mt} + \text{ ltb}^2 \text{ mt}^2 - (\text{lta ms} + \text{ ltb } (\text{ms} + \text{mt}))^2 \text{ Cos} [q2[t] - q4[t]] -
                                                                                    lsb ms (lta ms + ltb (ms + mt)) Cos[q2[t] - q5[t]]) q2'[t] +
                                 2 \text{ Ib mb q3'}[t] + 4 \text{ Ib ms q3'}[t] + 1b^2 \text{ mb ms q3'}[t] + 4 \text{ Ib mt q3'}[t] + 4 \text{ Ib mt q3'}[t] + 1b^2 \text{ mb ms q3
                                 1b^2 mb mt q3'[t] +
                                 1b \, 1sb \, mb \, ms \, Cos \, [q1[t] - q3[t]] \, q3'[t] +
                                 lb lta mb ms Cos [q2[t] - q3[t]] q3'[t] +
                                 1b 1tb mb ms Cos [q2[t] - q3[t]] q3'[t] +
                                 1b 1tb mb mt Cos [q2[t] - q3[t]] q3'[t] +
                                 1b 1ta mb ms Cos [q3[t] - q4[t]] q3'[t] +
                                 1b 1tb mb ms Cos[q3[t] - q4[t]] q3'[t] +
                                 1b 1tb mb mt Cos [q3[t] - q4[t]] q3'[t] +
                                 1b \, 1sb \, mb \, ms \, Cos \, [q3[t] - q5[t]] \, q3'[t] +
                                 2 \text{ It mb q4'}[t] + 4 \text{ It ms q4'}[t] + 2 \text{ Ita}^2 \text{ mb ms q4'}[t] +
                                 4 lta ltb mb ms q4'[t] + 2 ltb^2 mb ms q4'[t] +
                                 2 lta^2 ms^2 q4'[t] + 4 lta ltb ms^2 q4'[t] + 2 ltb^2 ms^2 q4'[t] +
                                 4 \text{ It mt } q4'[t] + 2 \text{ ltb}^2 \text{ mb mt } q4'[t] + 4 \text{ lta}^2 \text{ ms mt } q4'[t] +
                                 4 lta ltb ms mt q4'[t] + 4 ltb<sup>2</sup> ms mt q4'[t] +
                                 2 \text{ ltb}^2 \text{ mt}^2 \text{ q4'}[t] - 2 \text{ lsb lta ms}^2 \text{ Cos}[\text{q1}[t] - \text{q4}[t]] \text{ q4'}[t] -
                                 2 lsb ltb ms^{2} Cos [q1[t] - q4[t]] q4'[t] -
                                 2  lsb ltb ms mt Cos [q1[t] - q4[t]] q4'[t] -
                                 2 lta^2 ms^2 Cos[q2[t] - q4[t]] q4'[t] - 4 lta ltb ms^2 Cos[q2[t] - q4[t]] q4'[t] -
                                 2 \text{ ltb}^2 \text{ ms}^2 \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ Cos} [q2[t] - q4[t]] q4'[t] - 4 \text{ lta} \text{ ltb} \text{ ms} \text{ mt} \text{ ltb} \text{ ltb}
                                 4 \text{ ltb}^2 \text{ ms mt Cos}[q2[t] - q4[t]] q4'[t] - 2 \text{ ltb}^2 \text{ mt}^2 \text{ Cos}[q2[t] - q4[t]] q4'[t] +
                                 1b 1ta mb ms Cos[q3[t] - q4[t]] q4'[t] + 1b 1tb mb ms Cos[q3[t] - q4[t]] q4'[t] +
                                 1b\ 1tb\ mb\ mt\ Cos\ [q3[t]\ -\ q4[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ 2\ 1sb\ 1ta\ mb\ ms\ Cos\ [q4[t]\ -\ q5[t]\ ]\ q4'[t]\ +\ q4'[
                                 2 lsb ltb mb ms Cos [q4[t] - q5[t]] q4'[t] + 2 lsb lta ms<sup>2</sup> Cos [q4[t] - q5[t]] q4'[t] + 2
                                 2 lsb ltb ms mt Cos[q4[t] - q5[t]] q4'[t] + 2 ls mb q5'[t] +
                                 4 \text{ Is ms } q5'[t] + 2 \text{ lsb}^2 \text{ mb ms } q5'[t] + 2 \text{ lsb}^2 \text{ ms}^2 q5'[t] + 4 \text{ Is mt } q5'[t] +
                                 4 \, lsb^2 \, ms \, mt \, q5' \, [t] \, - \, 2 \, lsb^2 \, ms^2 \, Cos \, [q1[t] \, - \, q5[t]] \, q5'[t] \, -
                                 2 \cdot 1 + 3 \cdot 1 + 3 \cdot 1 = 3 \cdot 
                                 2 lsb ltb ms mt Cos[q2[t] - q5[t]] q5'[t] + 1b lsb mb ms Cos[q3[t] - q5[t]] q5'[t] + 1b
                                 2 \text{ lsb lta mb ms Cos}[q4[t] - q5[t]] q5'[t] + 2 \text{ lsb ltb mb ms Cos}[q4[t] - q5[t]] q5'[t] +
                                 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 1 + 2 \cdot 
                                 4 lsb lta ms mt Cos [q4[t] - q5[t]] q5'[t] + 2 lsb ltb ms mt Cos [q4[t] - q5[t]] q5'[t]), n
```

JacWhole = HurGetJacobian[COMWhole, n, n][[1;; 2, ;;]] // Simplify; JacWhole // MatrixForm

```
_ <u>lb mb Cos[q3[t]] (</u>]
- \frac{(1 \text{sb } (\text{mb+ms+2 mt}) + 1 \text{sa } (\text{mb+2 } (\text{ms+mt}))) \ \text{Cos}[\text{q1}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta } (\text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{t}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb } (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{Cos}[\text{q2}[\text{tb}]]}{- \frac{(1 \text{tb} (\text{mb+ms+mt}) + 1 \text{ta} \ \text{mb+ms+2 mt})) \ \text{
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      mb+2 (ms+mt)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2 (mb+2 (ms+mt))
                  mb+2 (ms+mt)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2 (mb+2 (ms+mt))
```

HurToJulia[JacWhole]

```
[-1*((mb+2*(ms+mt)))^{(-1)}*(lsb*(mb+(ms+2*mt))+lsa*(mb+2*(ms+mt)))*cos(q1)
        -1*((mb+2*(ms+mt)))^{(-1)}*(ltb*(mb+(ms+mt))+lta*(mb+(ms+2*mt)))*cos(q2)
        -1/2*1b*mb*((mb+2*(ms+mt)))^{(-1)}*cos(q3)
        ((mb+2*(ms+mt)))^{(-1)}*(lta*ms+ltb*(ms+mt))*cos(q4)
        1sb*ms*((mb+2*(ms+mt)))^{(-1)}*cos(q5); -1*((mb+2*(ms+mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt)))^{(-1)}*(1sb*(mb+(ms+2*mt))
        ) +lsa* (mb+2* (ms+mt))) *sin(q1)
        -1*((mb+2*(ms+mt)))^{(-1)}*(ltb*(mb+(ms+mt))+lta*(mb+(ms+2*mt)))*sin(q2)
        -1/2*1b*mb*((mb+2*(ms+mt)))^{(-1)}*sin(q3)
         ((mb+2*(ms+mt)))^{(-1)}*(lta*ms+ltb*(ms+mt))*sin(q4)
        lsb*ms*((mb+2*(ms+mt)))^{(-1)}*sin(q5)]
```

NJacWhole = NullSpace[JacWhole] // Simplify;

NJacWhole // MatrixForm (*I should expect 3 5D column vectors. It'

- s weird that Mathematica gives 3x5 matrix, not 5x3 matrix. Anyway,
- a vector with 5 element is the basis vector for the null space.*)

```
\_ lsb ms Csc[q1[t]-q2[t]] Sin[q2[t]-q5[t]]
                                                                                                                      lsb ms Csc[q1[t]-q2[t]] Sin[q1[t]-q5[t]]
                                                                                                                                                                                                               0 0
                     1 \\ \text{sb} \ (\text{mb+ms+2 mt}) + 1 \\ \text{sa} \ (\text{mb+2} \ (\text{ms+mt}) \ )
                                                                                                                               ltb\ (mb+ms+mt) + lta\ (mb+ms+2\ mt)
 \underline{\quad (\text{lta}\,\text{ms+ltb}\,(\text{ms+mt}))\,\,\text{Csc}\,[\text{q1}[\text{t}]-\text{q2}[\text{t}])\,\,\text{Sin}[\text{q2}[\text{t}]-\text{q4}[\text{t}])} \quad \underline{\quad (\text{lta}\,\text{ms+ltb}\,(\text{ms+mt}))\,\,\text{Csc}\,[\text{q1}[\text{t}]-\text{q2}[\text{t}])\,\,\text{Sin}[\text{q1}[\text{t}]-\text{q4}[\text{t}]]} }
                                                                                                                                                                                                               0 1
                     lsb (mb+ms+2mt) + lsa (mb+2 (ms+mt))
                                                                                                                               ltb (mb+ms+mt) + lta (mb+ms+2 mt)
               \underline{lb\,mb\,Csc\,[q1[t]-q2[t]\,]\,Sin\,[q2[t]-q3[t]\,]}
                                                                                                                     <u>lb mb Csc [q1[t]-q2[t]] Sin [q1[t]-q3[t]]</u>
                                                                                                                                                                                                               1 0
                2 (lsb (mb+ms+2 mt) +lsa (mb+2 (ms+mt)))
                                                                                                                              \\ 2 \; ( \texttt{ltb} \; (\texttt{mb+ms+mt}) \; + \texttt{lta} \; (\texttt{mb+ms+2 mt}) \; ) \\
```

JacWhole.HurList2Column[NJacWhole[[1, ;;]]] // Simplify

 $\{\{0\}, \{0\}\}$

Nmat = Transpose[NJacWhole];

Nmat // MatrixForm

```
lsb\,ms\,Csc\,[q1[t]-q2[t]]\,Sin\,[q2[t]-q5[t]] \qquad \qquad (lta\,ms+ltb\,(ms+mt))\,\,Csc\,[q1[t]-q2[t]]\,\,Sin\,[q2[t]-q4[t]]
                                                                                                                                                                       1b \, mb \, Csc \, [\, q1 \, [\, t\, ] \, -q2 \,
        lsb (mb+ms+2mt) + lsa (mb+2 (ms+mt))
                                                                                           lsb (mb+ms+2mt) + lsa (mb+2 (ms+mt))
                                                                                                                                                                        2 (1sb (mb+ms+2 mt
 \underline{lsb\,ms\,Csc\,[q1[t]-q2[t]\,]\,\,Sin\,[q1[t]-q5[t]\,]}
                                                                          (\texttt{lta}\, \texttt{ms+ltb}\,\,(\texttt{ms+mt})\,)\,\, \texttt{Csc}\, [\texttt{q1}[\texttt{t}]\, -\texttt{q2}[\texttt{t}]\,]\,\, \texttt{Sin}\, [\texttt{q1}[\texttt{t}]\, -\texttt{q4}[\texttt{t}]\,]
                                                                                                                                                                      _ lb mb Csc [q1[t] -q2
         ltb\ (mb+ms+mt) + lta\ (mb+ms+2\ mt)
                                                                                            ltb\ (mb+ms+mt) + lta\ (mb+ms+2\ mt)
                                                                                                                                                                             2 (ltb (mb+ms+m
                                0
                                                                                                                   0
                                a
                                                                                                                    1
                                1
                                                                                                                    0
```

HurToJulia[Nmat]

```
[-1*lsb*ms*((lsb*(mb+(ms+2*mt))+lsa*(mb+2*(ms+mt))))^{(-1)}*csc((q1+-1*q2))*sin((q2+1))
        -1*(1ta*ms+1tb*(ms+mt))*((1sb*(mb+(ms+2*mt))+1sa*(mb+2*(ms+mt))))^{(-1)}*csc((q1+-1)*(1ta*ms+1tb*(ms+mt)))
        1*q2)) *sin((q2+-1*q4))
        1/2 * 1b * mb * ( (1sb * (mb + (ms + 2 * mt)) + 1sa * (mb + 2 * (ms + mt))) ) ^ (-1) * csc ( (q1 + -1 * q2)) * sin ( (q2 + 1) * (q2 + 1) * (q3 + 1) * (q3 + 1) * (q4 + 1) * (q
        +-1*q3); lsb*ms*((ltb*(mb+(ms+mt))+lta*(mb+(ms+2*mt))))^(-1)*csc((q1+-1*q2))*sin
         ((q1+-1*q5))
        (lta*ms+ltb*(ms+mt))*((ltb*(mb+(ms+mt))+lta*(mb+(ms+2*mt))))^{(-1)}*csc((q1+-1*q2))
        )*sin((q1+-1*q4))
        -1/2*lb*mb*((ltb*(mb+(ms+mt))+lta*(mb+(ms+2*mt))))^{-1}*csc((q1+-1*q2))*sin((q1+1*q2))
        -1*q3));0 0 1;0 1 0;1 0 0]
```

Projector = Nmat.Inverse[Transpose[Nmat].Nmat].Transpose[Nmat]

```
\{\{-\left( \mathsf{lsb} \cdots \mathsf{3} \cdots \right) \}
                                                                    \left(-\left(\left|\mathsf{1sb\,ms\,Csc}\left[\cdots 1\cdots\right]\right|\left(-\left(\left|\mathsf{1b}\cdots 4\cdots\right|\mathsf{Sin}\left[\cdots 1\cdots\right]\right)\right)\right/\left(2\cdots 1\cdots^{2}\right)\right)-\left(\left|\mathsf{1sb\,ms\,Csc}\left[\cdots 1\cdots\right|\right]\right)\right)
                                                                                                                                                                                \frac{ \cdots 1 \cdots }{ 2 \cdots 1 \cdots } \right)^2 + \left( 1 + \frac{ \cdots 1 \cdots }{ 4 \cdots 1 \cdots ^2} + \left( 1b^2 \text{ mb}^2 \cdots 1 \cdots ^2 \cdots 1 \cdots ^2 \right) \right) 
                                                                                                                                                                                 \left(4\left(\cdots 1\cdots\right)^{2}\right)\left(1+\cdots 1\cdots+\cdots 1\cdots\right) Sin[
                                                                                                                                    q2[t] - q5[t] \ \ \left(\left(1sb \left(mb + ms + 2 mt\right) + 1sa \left(mb + 2 \left(ms + mt\right)\right)
                                                                                                                                \left(\left(-\left(\left(\text{lb lsb mb ms} \dots 1 \dots \right)^2 \text{Sin}\left[\text{q1}[\text{t}] - \text{q3}[\text{t}]\right] \text{Sin}\left[\text{q1}[\text{t}] - \text{q5}[\text{t}]\right]\right)\right)
                                                                                                                                                                                                 \left(2\left(1\mathsf{tb}\cdots 1\cdots + \cdots 1\cdots\right)^{2}\right)\right) - \frac{\cdots 1\cdots}{2\cdots 1\cdots 2}
                                                                                                                                                       (-(...1...) - ...1...+ ...1...) - ...1...+ ...1...
                                                                                  \left(1 \text{ sb } \left(\text{mb} + \text{ms} + 2 \text{ mt}\right) + 1 \text{sa } \left(\text{mb} + 2 \text{ ms} + \text{mt}\right)\right)\right)
                              (lsb (mb + ms + 2 mt) + lsa (mb + 2 (ms + mt))) +
                                1b
                                                    \left| - \left( \left( 1sb \cdots 3 \cdots \right) \left( - \left( 1 + \frac{\cdots 1 \cdots}{\cdots 1 \cdots 2} + \frac{\cdots 1 \cdots}{\cdots 1 \cdots 2} \right) \right) \left( \cdots 1 \cdots \right) + \cdots 1 \cdots \right) \right) \right| 
                                                                                            \left( \, \left( \, \texttt{lsb} \, \left( \, \texttt{mb} \, + \, \texttt{ms} \, + \, 2 \, \, \texttt{mt} \, \right) \, + \, \texttt{lsa} \, \left( \, \texttt{mb} \, + \, 2 \, \left( \, \texttt{ms} \, + \, \texttt{mt} \, \right) \, \right) \, \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \right) \, \, \right) \, - \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \right) \, + \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \right) \, + \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \right) \, \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \right) \, \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1 \, \cdots \, \right) \, \left( \, \cdots \, 1
                                                                    \cdots 1 \cdots + \frac{1b \cdots 3 \cdots (\cdots 1 \cdots)}{2 (\cdots 1 \cdots) (\cdots 1 \cdots)} 
                                     (2 (lsb (mb + ms + 2 mt) + lsa (mb + 2 (ms + mt)))),
 large output
                                                                                                   show less
                                                                                                                                                                                        show more
                                                                                                                                                                                                                                                                                     show all
                                                                                                                                                                                                                                                                                                                                                                   set size limit...
```

Projector[[1, 1]] // Simplify

\$Aborted

```
HurSaveData["data1.m", "FootST", "ShankSTCOM", "KneeST", "ThighSTCOM",
 "Hip", "TorsoCOM", "ThighSWCOM", "KneeSW", "ShankSWCOM", "FootSW", "dyn1",
 "dyn2", "dyn3", "dyn4", "dyn5", "stepLength", "stepHeight", "verticalVel",
 "horizontalVel", "JacFootSW", "COMWhole", "LinearMomentumWholeBody",
 "LinearMomentumRateWholeBody", "JacWhole", "NJacWhole", "invans"]
HurGetRelativeDCM[a, n] // MatrixForm // Simplify
HurGetRelativeDCM[b, a] // MatrixForm // Simplify
HurGetRelativeDCM[c, b] // MatrixForm // Simplify
HurGetRelativeDCM[d, c] // MatrixForm // Simplify
HurGetRelativeDCM[e, d] // MatrixForm // Simplify
HurGetRelativeDCM[e, n] // MatrixForm // Simplify
 Cos[q1[t]] - Sin[q1[t]] 0
 Sin[q1[t]] Cos[q1[t]]
      0
                   0
  Cos[q1[t] - q2[t]] Sin[q1[t] - q2[t]]
 -Sin[q1[t] - q2[t]] Cos[q1[t] - q2[t]]
  Cos[q2[t] - q3[t]] Sin[q2[t] - q3[t]]
 -Sin[q2[t] - q3[t]] Cos[q2[t] - q3[t]]
  Cos[q3[t] - q4[t]] Sin[q3[t] - q4[t]]
 -Sin[q3[t] - q4[t]] Cos[q3[t] - q4[t]]
                                         0
  Cos[q4[t] - q5[t]] Sin[q4[t] - q5[t]]
 -Sin[q4[t] - q5[t]] Cos[q4[t] - q5[t]]
 Cos[q5[t]] - Sin[q5[t]] 0
 Sin[q5[t]] Cos[q5[t]]
```