$$theta2dotdot = -\frac{2\left(\left(l_1 m_1 + l_1 m_2\right)\cos\left(\phi_1(t)\right)^4 + 2\left(l_1 m_1 + l_1 m_2\right)\cos\left(\phi_1(t)\right)^2 \sin\left(\phi_1(t)\right)^2 + \left(l_1 m_1 + l_1 m_2\right)\sin\left(\phi_1(t)\right)^4\right)\cos\left(\theta_1(t)\right)\sin\left(\theta_1(t)\right)^2 D[\theta](\phi_1)(t)^2 + \left(2\left(\left(l_2 m_1 + l_2 m_2\right)\cos\left(\phi_1(t)\right)^4 + 2\left(l_2 m_1 + l_2 m_2\right)\cos\left(\phi_1(t)\right)^2 \sin\left(\phi_1(t)\right)^2 + \left(l_2 m_1 + l_2 m_2\right)\sin\left(\phi_1(t)\right)^4\right)\cos\left(\theta_1(t)\right)^2 + \left(2 l_2 m_2 \cos\left(\phi_1(t)\right)\sin\left(\phi_1(t)\right) + \left(2 l_2 m_1 + l_2 m_2\right)\cos\left(\phi_1(t)\right)^2 + \left(2 l_2 m_1 + l_2 m_2\right)\sin\left(\phi_1(t)\right)^2\right)\sin\left(\theta_1(t)\right)^2\right)\cos\left(\theta_2(t)\right) D[\theta](\theta_2)(t)^2 + 2\left(\left(g m_1 + g m_2\right)\cos\left(\phi_1(t)\right)^4 + 2\left(g m_1 + g m_2\right)\cos\left(\phi_1(t)\right)^2 \sin\left(\phi_1(t)\right)^2 + \left(g m_1 + g m_2\right)\sin\left(\phi_1(t)\right)^4\right)\cos\left(\theta_1(t)\right)^2 + 2\left(\left(\left(l_1 m_1 + l_1 m_2\right)\cos\left(\phi_1(t)\right)^4 + 2\left(l_1 m_1 + l_1 m_2\right)\cos\left(\phi_1(t)\right)^2 \sin\left(\phi_1(t)\right)^2 + \left(l_1 m_1 + l_1 m_2\right)\sin\left(\phi_1(t)\right)^4\right)\cos\left(\theta_1(t)\right)^3 + \left(\left(l_1 m_1 + l_1 m_2\right)\cos\left(\phi_1(t)\right)^4 + 2\left(l_1 m_1 + l_1 m_2\right)\cos\left(\phi_1(t)\right)^2 \sin\left(\phi_1(t)\right)^2 + \left(l_1 m_1 + l_1 m_2\right)\sin\left(\phi_1(t)\right)^4\right)\cos\left(\theta_1(t)\right)\sin\left(\theta_1(t)\right)^2\right) D[\theta](\theta_1)(t)^2}{\left(2\left(\left(l_2 m_1 + l_2 m_2\right)\cos\left(\phi_1(t)\right)^4 + 2\left(l_2 m_1 + l_2 m_2\right)\cos\left(\phi_1(t)\right)^2 \sin\left(\phi_1(t)\right)^2 + \left(l_2 m_1 + l_2 m_2\right)\sin\left(\phi_1(t)\right)^4\right)\cos\left(\theta_1(t)\right)^2 + \left(2 l_2 m_2 \cos\left(\phi_1(t)\right)\sin\left(\phi_1(t)\right) + \left(2 l_2 m_1 + l_2 m_2\right)\cos\left(\phi_1(t)\right)^2 + \left(2 l_2 m_1 + l_2 m_2\right)\sin\left(\phi_1(t)\right)^2\right)\sin\left(\theta_1(t)\right)^2\right)\sin\left(\theta_2(t)\right)} \tag{1}$$