$$\ddot{\theta}_1 \tag{1}$$

$$= \frac{\left(2\,l_2 m_2^2 \cos\left(\phi_1\right)\sin\left(\phi_1\right) + \left(2\,l_2 m_1 m_2 + l_2 m_2^2\right)\cos\left(\phi_1\right)^2 - 2\left(2\,l_2 m_2^2 \cos\left(\phi_1\right)\sin\left(\phi_1\right) + \left(2\,l_2 m_1 m_2 + l_2 m_2^2\right)\cos\left(\phi_1\right)^2 + \left(2\,l_2\right.\right.}{}$$

$$\ddot{\theta}_2 = -\frac{\left(4\left(\left(l_2 m_1^2 + l_2 m_1 m_2\right)\cos\left(\phi_1\right)^4 + 2\left(l_2 m_1^2 + l_2 m_1 m_2\right)\cos\left(\phi_1\right)^2 \sin\left(\phi_1\right)^2 + \left(l_2 m_1^2 + l_2 m_1 m_2\right)\sin\left(\phi_1\right)^4 - \left(\left(l_2 m_1^2 + l\right.\right.\right.}{}$$

$$\tag{2}$$