Hamiltonian

$$\mathcal{H} = \frac{J_x^2}{m_1 m_2 r_0^2 \left(2m_1 + m_3\right) R^2(t) \sin^2\left(\theta(t)\right)} \Big(m_1^2 r_0^2 \cos^2\left(\theta(t)\right) \tag{1}$$
$$+ \frac{m_1 m_2}{2} r_0^2 \cos^2\left(\theta(t)\right) + 2m_1 m_2 R^2(t) + \frac{m_1 m_3}{2} r_0^2 \cos^2\left(\theta(t)\right)$$
$$+ m_2 m_3 R^2(t) \Big) + \frac{J_x J_y \left(-2m_1 - m_2 - m_3\right)}{m_2 \left(2m_1 + m_3\right) R^2(t) \tan\left(\theta(t)\right)}$$
$$+ J_y^2 \left(\frac{2m_1}{4m_1 m_2 R^2(t) + 2m_2 m_3 R^2(t)} + \frac{m_2}{4m_1 m_2 R^2(t) + 2m_2 m_3 R^2(t)} \right.$$
$$\left. + \frac{m_3}{4m_1 m_2 R^2(t) + 2m_2 m_3 R^2(t)} \right) + J_z^2 \left(\frac{2m_1}{4m_1 m_2 R^2(t) + 2m_2 m_3 R^2(t)} \right.$$
$$\left. + \frac{m_2}{4m_1 m_2 R^2(t) + 2m_2 m_3 R^2(t)} + \frac{m_3}{4m_1 m_2 R^2(t) + 2m_2 m_3 R^2(t)} \right)$$
$$+ \frac{J_z \left(2m_1 + m_2 + m_3\right) \left(2m_1^2 r_0^2 + m_1 m_2 r_0^2 + 4m_1 m_2 R^2(t) + m_1 m_3 r_0^2 + 2m_2 m_3 R^2(t)\right) p_\theta(t)}{2m_2 \left(2m_1 + m_3\right) \left(m_1^2 r_0^2 + \frac{m_1 m_2}{2} r_0^2 + 2m_1 m_2 R^2(t) + \frac{m_1 m_3}{2} r_0^2 + m_2 m_3 R^2(t)\right) R^2(t)}$$
$$+ \frac{\left(2m_1 + m_2 + m_3\right) p^2(t)}{2m_2 \left(2m_1 + m_3\right)} + \frac{{p_\theta}^2(t)}{2m_1 m_2 r_0^2 \left(2m_1 + m_3\right) R^2(t)} \left(2m_1^2 r_0^2 \right.$$
$$\left. + m_1 m_2 r_0^2 + 4m_1 m_2 R^2(t) + m_1 m_3 r_0^2 + 2m_2 m_3 R^2(t)\right)$$