

## Hamiltonian

$$\begin{aligned}\mathcal{H} = & -\frac{J_x^2 \left( \frac{1}{r_2^2(t)} + \frac{1}{r_1^2(t)} \right)}{4m (\cos(q(t)) - 1)} + \frac{J_x J_z \left( \frac{1}{r_2^2(t)} - \frac{1}{r_1^2(t)} \right)}{2m \sin(q(t))} \\ & + J_y^2 \left( \frac{1}{8mr_2^2(t)} + \frac{1}{8mr_1^2(t)} \right) + J_y \left( \frac{1}{2mr_2^2(t)} - \frac{1}{2mr_1^2(t)} \right) p(t) \\ & + \frac{J_z^2 \left( \frac{1}{r_2^2(t)} + \frac{1}{r_1^2(t)} \right)}{4m (\cos(q(t)) + 1)} + \left( \frac{1}{2mr_2^2(t)} + \frac{1}{2mr_1^2(t)} \right) p^2(t) + \frac{p_1^2(t)}{2m} + \frac{p_2^2(t)}{2m}\end{aligned}\tag{1}$$