

[mex178] Rolling pendulum

Consider a homogeneous cylinder of mass m and radius a rolling on the inside of a cylindrical surface with radius R . The cylinder axes are horizontal. There is a uniform, vertical gravitational field \mathbf{g} .

- (a) Find the Lagrangian $L(\phi, \dot{\phi})$.
- (b) Find the period τ of small-amplitude oscillations about the stable equilibrium position.

