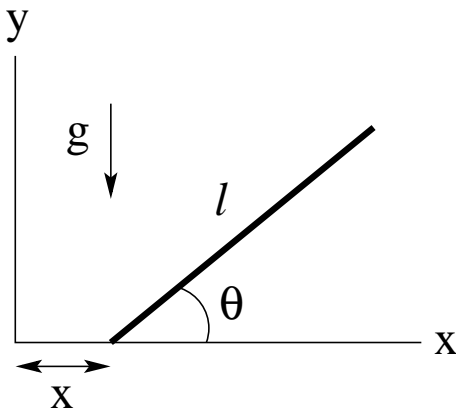


[mex115] Rotating and sliding

A rod of mass m and length ℓ moves in a vertical plane with one end constrained to slide along the x -axis.

- (a) Find the Lagrangian $L(x, \theta, \dot{x}, \dot{\theta})$.
- (b) Find the conserved generalized momentum β_x associated with the cyclic coordinate x .
- (c) Find the Routhian function $R(\theta, \dot{\theta}, \beta_x)$.



Solution: