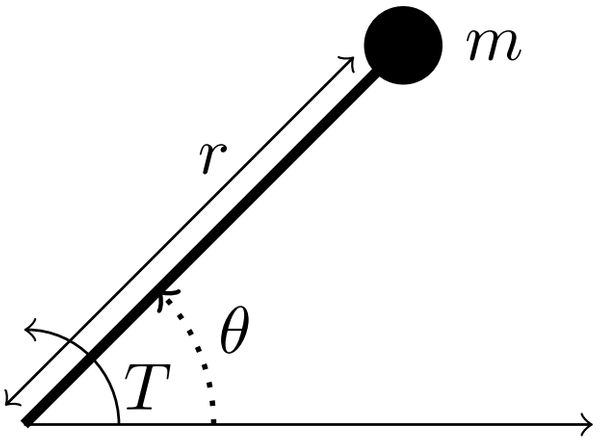

Assume a point mass m at radius r from a pivot point attached by a massless arm with length r. The angle of the arm is θ, a function of time. The torque applied to the arm is T, positive in the counterclockwise direction. The moment of inertia is given by

$$I = mr^2.$$

The angular version of Newton's second law is

$$T = I\ddot{\theta}.$$

The torque due to gravity is given by

$$T_g = -mrg\cos(\theta),$$

where $g = 9.81$ m/s^2 is the acceleration of gravity at sea level. The net torque is $T - T_g$. Hence,

$$\ddot{\theta} = \frac{T}{mr^2} - \frac{g\cos(\theta)}{r}.$$