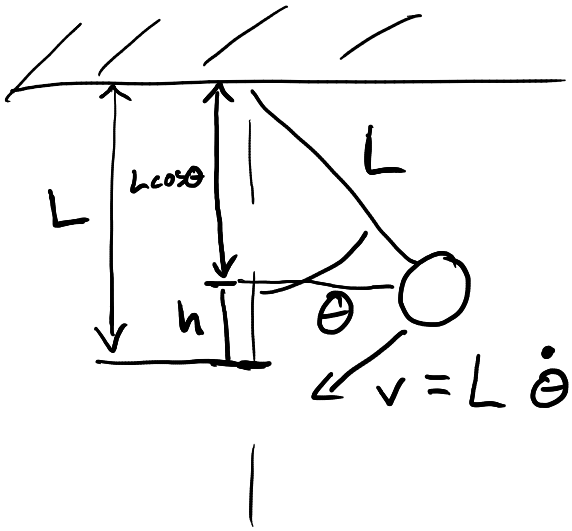


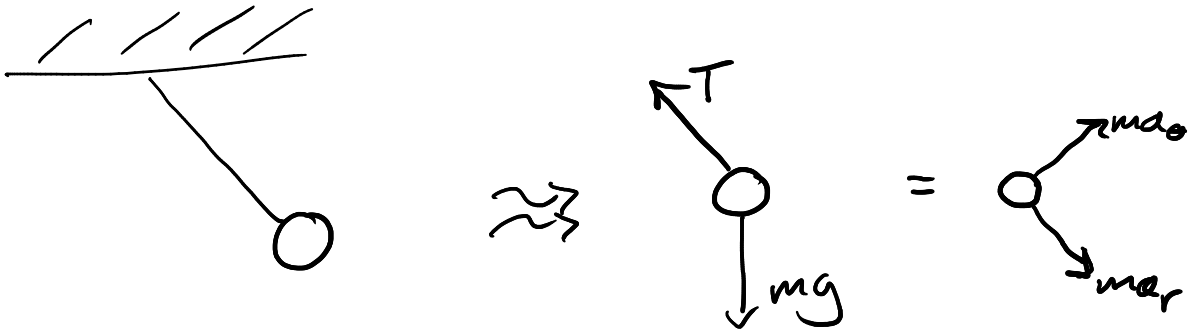
$$T = \tfrac{1}{2} m v^2$$

$$V = mgh$$

$$T = \tfrac{1}{2} m L^2 \dot{\theta}^2$$

$$V = mg(L - L\cos\theta)$$

$$T + V = \text{total\_energy} = \text{constant}$$



$\hat{e}_r \rightarrow (1) \quad mg\cos\theta - T = m(-r\dot{\theta}^2)$

$\hat{e}_\theta \rightarrow (2) \quad -g/L \sin\theta = \ddot{\theta}$

$T = mg\cos\theta + mr\dot{\theta}^2$