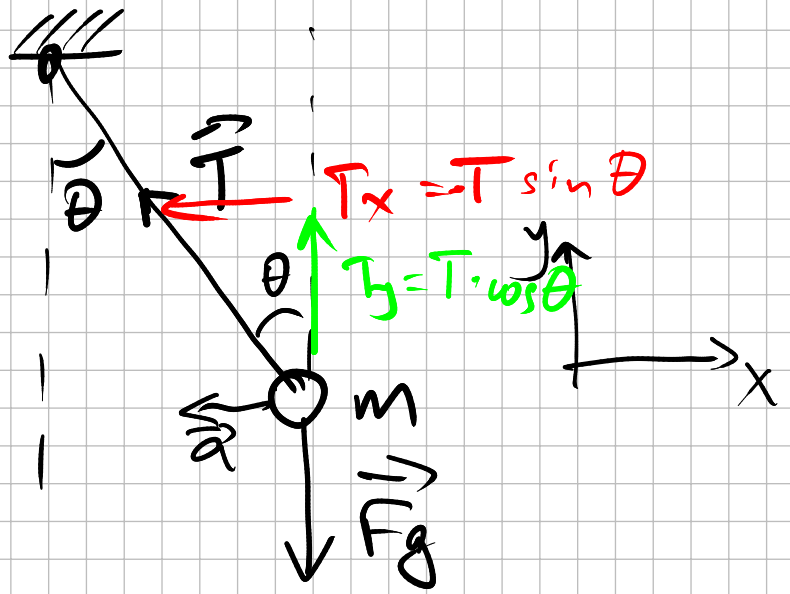
$$\vec{F}_{AB} = -\vec{F}_{BA}$$ 3rd Newtons law

$$\vec{F}_{net} = m\vec{a}$$ 2nd N. L.

$$\vec{F}_{net} = \vec{F}_g + \vec{T} = m\vec{a}$$



x: $F_{gx} + T_x = ma_x$

$0 + T_x = ma_x$

y: $F_{gy} + T_y = ma_y$

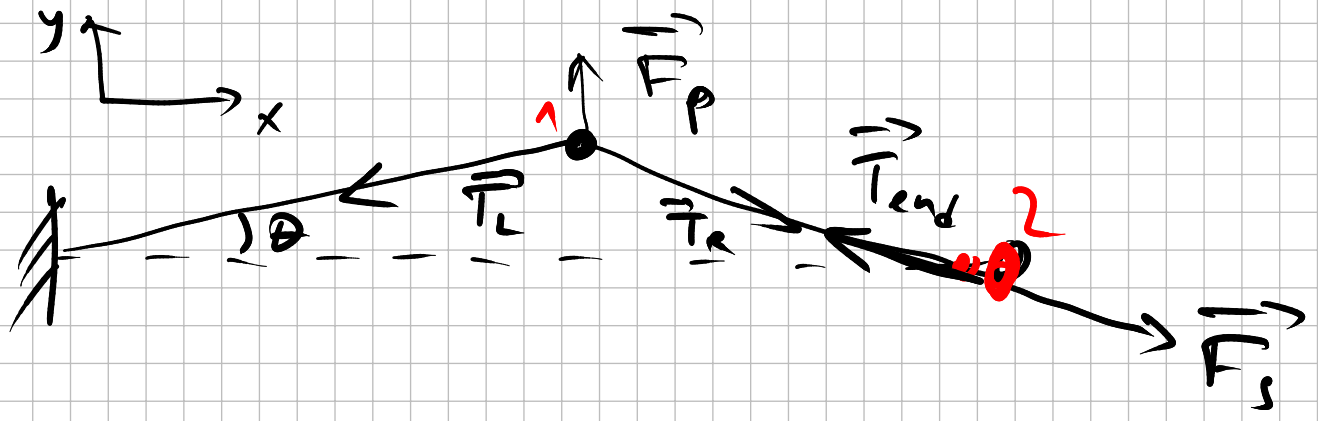
$-mg + T_y = 0$

$x: \quad -T\sin\theta = -ma$

$y: \quad -mg + T\cos\theta = 0 \quad \Rightarrow \quad T = \frac{mg}{\cos\theta}$

$$-\cancel{mg}\,\frac{\sin\theta}{\cos\theta} = -\cancel{m}a$$

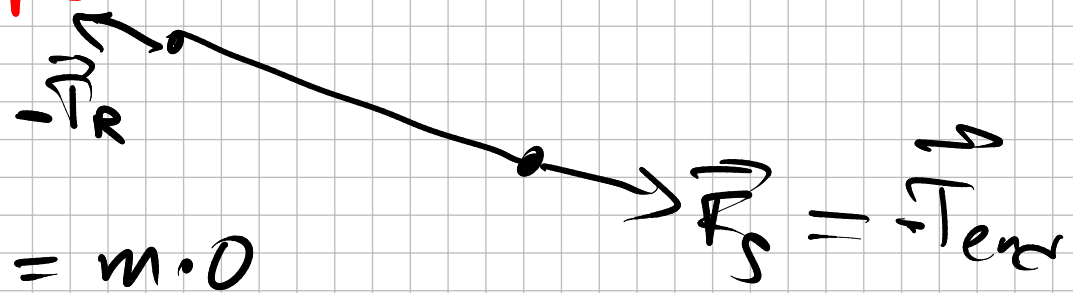
$$\boxed{a = g\,\frac{\sin\theta}{\cos\theta} = g\cdot\tan(\theta)}$$



1) $\begin{cases} \vec{F}_{net} = m\vec{a} = 0 \\ \vec{F}_P + \vec{T}_L + \vec{T}_R = 0 \end{cases}$

2) $\begin{cases} \vec{F}_S + \vec{T}_{end} = m\vec{a}_{end} = 0 \\ \vec{T}_{end} = -\vec{F}_S \end{cases}$

3) rope



1) y: $F_P - 2 \cdot \underset{\parallel}{\overset{\parallel}{T_R}} \cdot \sin\theta = m \cdot 0$

F_S

T_L

$$F_P - 2F_S \cdot \sin\theta = 0$$

$$F_S = N_S \cdot F_M \quad ; \quad F_P = F_M$$

$$\cancel{F_M} - 2N_S \cdot \cancel{F_M} \cdot \sin\theta = 0$$

$$\sin\theta = \frac{1}{2N_S}$$

$$\Delta L = L - 2\frac{L}{2}\cos\theta$$

$$L$$

$$= L(1 - \cos\theta)$$