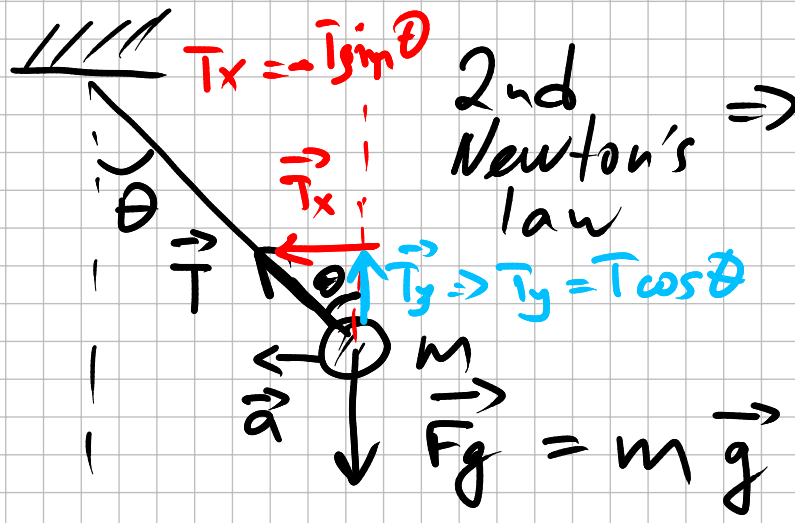


2nd Newton's law $\Rightarrow m\vec{a} = \vec{F}_{net} = \vec{T} + \vec{F}_g$

$$\begin{cases} x: & m\underbrace{a_x}_{-a} = T_x + \cancel{F_{gx}}^{\,0} \\ y: & m\cancel{a_y}^{\,0} = T_y + F_{gy} \end{cases}$$

$a_y = 0$ by construction

$$\begin{cases} x: & -ma = -T\sin\theta \\ y: & 0 = T\cos\theta + (-mg) \end{cases}$$

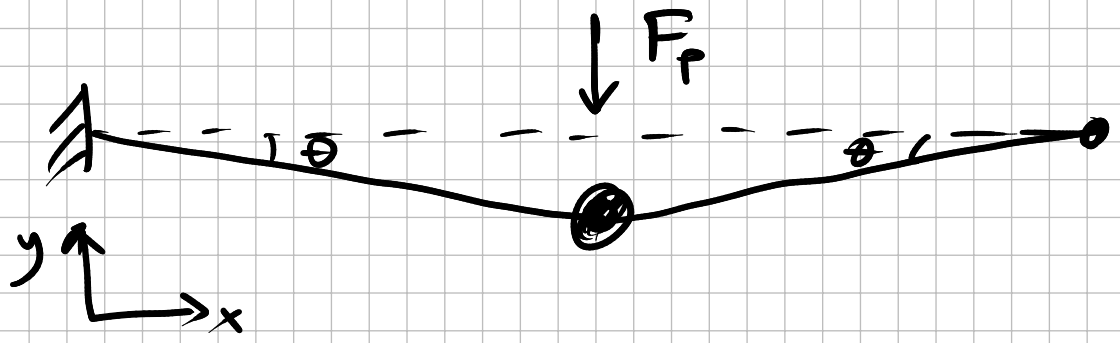
$$T = \frac{mg}{\cos\theta}$$

$$-ma = -\frac{mg}{\cos\theta}\sin\theta$$

$$\boxed{a = g\tan\theta}$$

if $\theta = 45°$ $\Rightarrow$ $a = g\cdot\tan 45° = g$

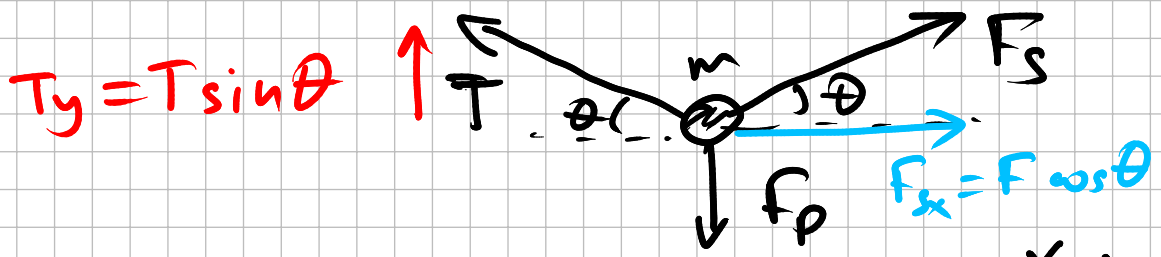
Ex



b/s everything 0 is static

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

$$\vec{0} = \vec{F}_p + \vec{F}_s + \vec{T}$$



$$x: \quad 0 = F_{px} + F_{sx} + T_x$$

$F_{px} = 0$

$$x: \quad T_x = -F_{sx}$$

$$-T\cos\theta = -F_s\cos\theta$$

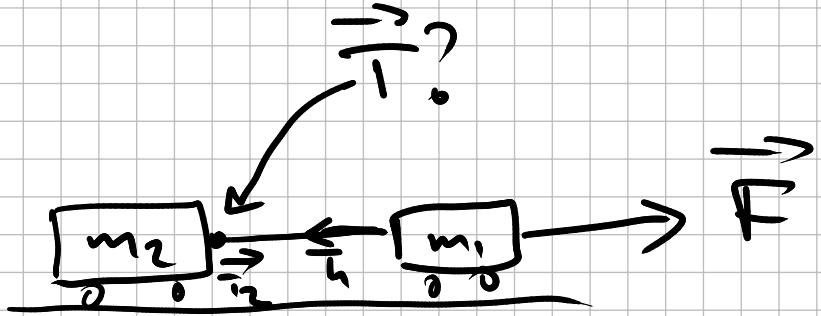
$$y: \quad 0 = F_{py} + F_{sy} + T_y$$

$$0 = -F_p + F_s\sin\theta + T\sin\theta$$

$$\boxed{F_p = 2F_s\sin\theta}$$

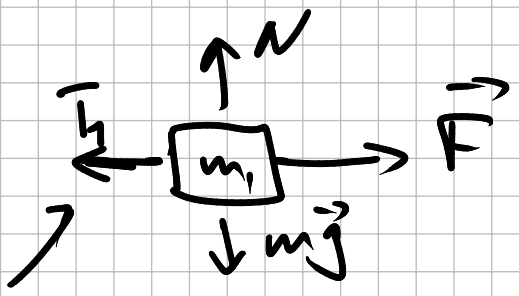
$$\boxed{F_s = \frac{F_p}{2\sin\theta}}$$

Applic. of 3rd Newton's law



No friction force

$\vec{a}$?

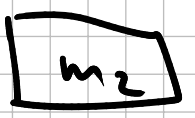


1: $m_1 \vec{a}_1 = \vec{F} + \vec{N} + m\vec{g} + \vec{T}_1$ (0)

3rd Newton's law

2: $m_2 \vec{a}_2 = \vec{T}_2$

3rd law



3 (rope) $m_{rope} \vec{a}_{rope} = -\vec{T}_2 - \vec{T}_1$

x: $m_r a_{r_x} = -|T_{2x}| + |T_{1x}|$

if $m_r = 0$ $\Rightarrow$ Tension is same everywhere in a rope