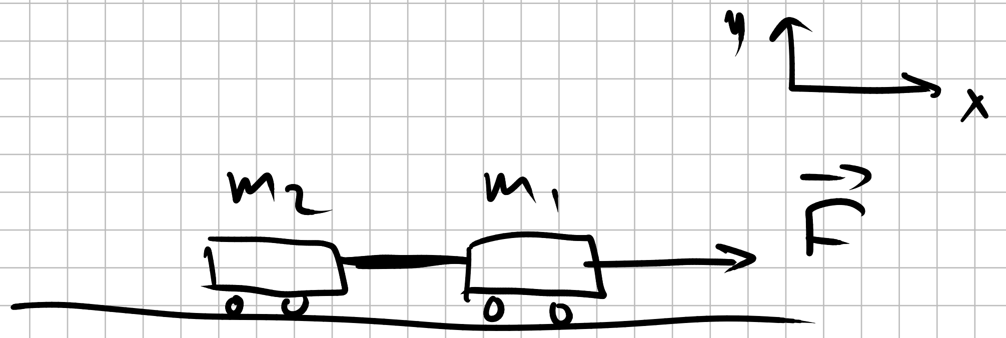


the link / rope is massless !

Then $T_1 = T_2$

$$m\vec{a}_1 = \vec{F} + \vec{T}$$

$$m_2 a_{x_2} = T_x = T$$

$$m_1 a_{1_x} = F_x + T_x = F - T$$

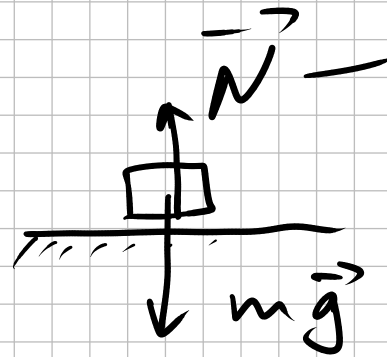
$|F_x| = F$ $\quad |T_x| = T$

$$a_{x_2} = a_{x_1} = a$$ (B/s objects are linked)

$$x: \begin{cases} m_1 a = F - T \\ m_2 a = T \end{cases}$$

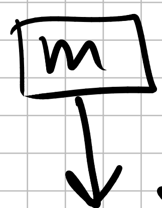
$$m_1 a + m_2 = F - T + T = F$$

$$\boxed{a = \frac{F}{m_1 + m_2}} \qquad \boxed{T = F \cdot \frac{m_2}{m_1 + m_2}}$$



— normal force (90° to the surface)

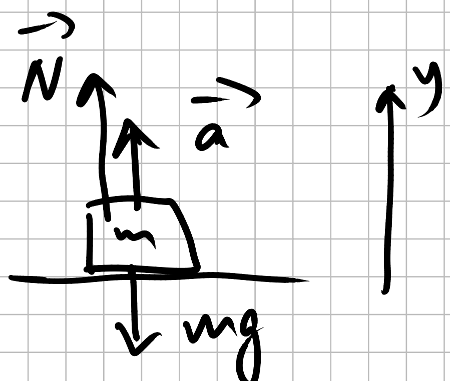
Weight is $|\vec{N}|$



$\vec{g} = \vec{a}$

$$m\vec{a} = m\vec{g} + \vec{N}$$

if $\vec{g} = \vec{a} \Rightarrow \vec{N} = 0$

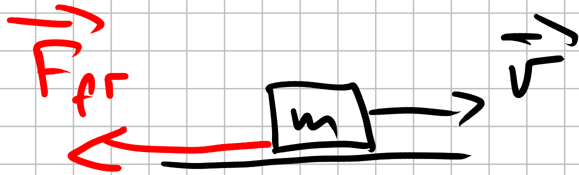


$$m\vec{a} = m\vec{g} + \vec{N}$$

y: $ma = -mg + N$

weight $\Leftrightarrow$ $N = m(a+g)$

Friction



"mu"

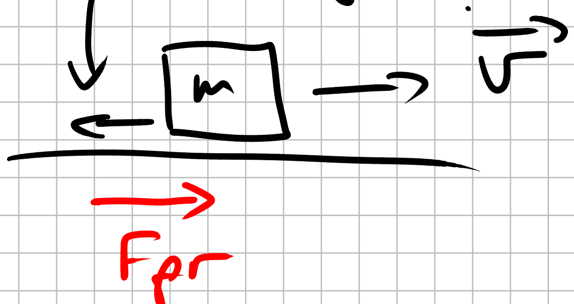
$$F_{fr} = \mu N$$

$$\mu \in (0, 2)$$

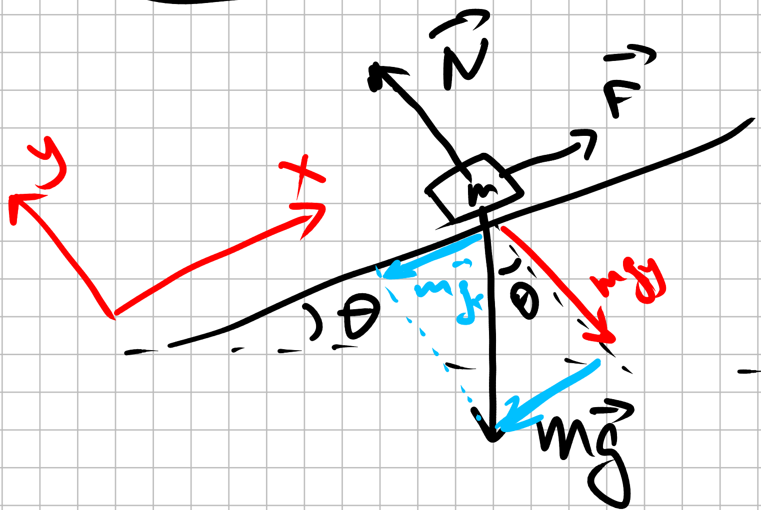
kinetic or static

$$\mu_k < \mu_s$$

Prof pushing on the floor



Inclaned planes (ramps)



in equilibrium
$\vec{a} = 0$

$$m\underset{0}{\underset{\parallel}{\vec{a}}} = m\vec{g} + \vec{N} + \vec{F}$$

$$\begin{cases} x: & m \cdot 0 = \underline{-mg\sin\theta} + 0 + F \\ y: & m \cdot 0 = \underline{-mg\cos\theta} + N + 0 \end{cases}$$

y: $\Rightarrow$ $N = mg\cos\theta$

x: $\Rightarrow$ $0 = -mg\sin\theta + F$

$$\boxed{F = mg\sin\theta}$$