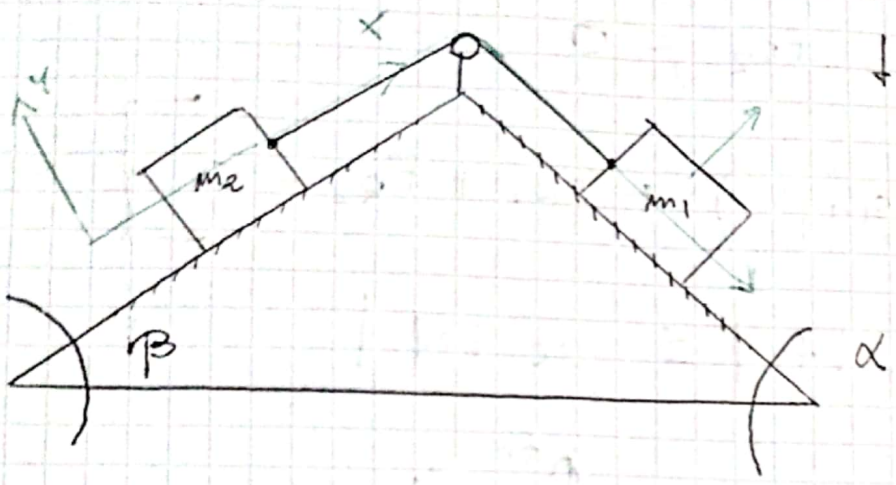
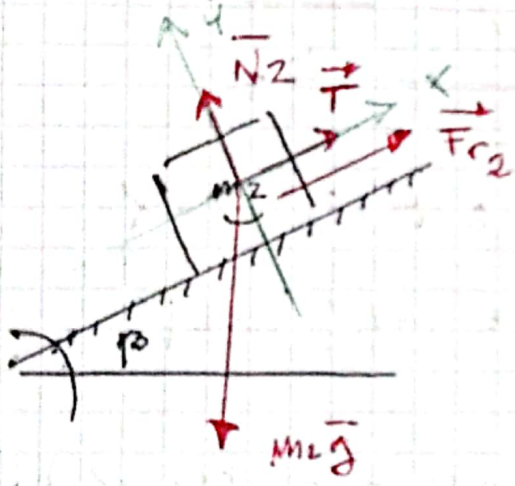
Dinámica (15)

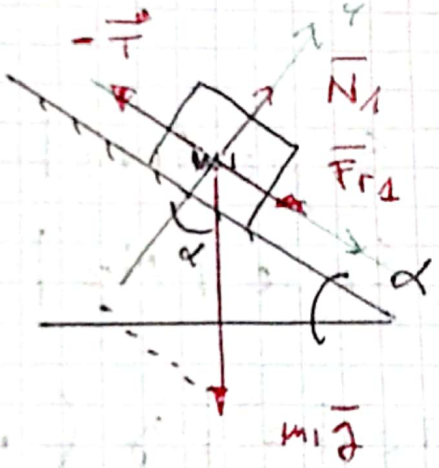


$\mu_d = 0{,}25$

$\mu_e = 0{,}3$

(a) Reposo en $t=0$. ¿ condiciones para reposo en $t>0$?





Newton 1:

(x) $m_1 g \operatorname{sen}\alpha - T + F_{R_1} = m_1 \ddot{x}_1 = 0$

(y) $N_1 - m_1 g \cos\alpha = m_1 \ddot{y}_1 = 0$

2:

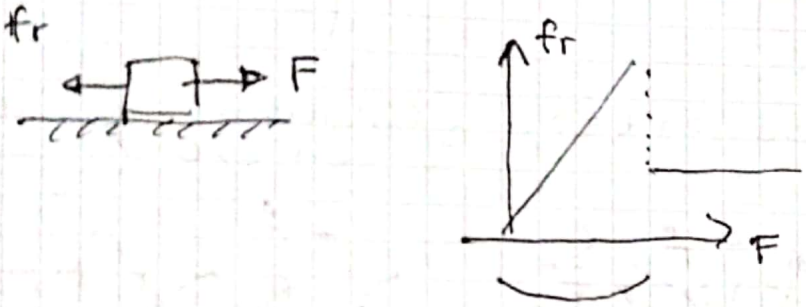
(x) $-m_2 g \operatorname{sen}\beta + T + F_{R_2} = m_2 \ddot{x}_2 = 0$.

(y) $N_2 - m_2 g \cos\beta = m_2 \ddot{y}_2 = 0$

$$\begin{cases} m_1 g \sin\alpha - T + F_{R_1} = 0 \\ -m_2 g \sin\beta + T + F_{R_2} = 0 \end{cases}$$

$$\boxed{g\left(m_1 \sin\alpha - m_2 \sin\beta\right) + F_{R_1} + F_{R_2} = 0}$$

Reposo $\longrightarrow$ $|f_r| \leq \mu_e |N|$



$$|F_{R_1}| \leq \mu_e |N_1| = \mu_e m_1 g \cos\alpha$$

$$|F_{R_2}| \leq \mu_e |N_2| = \mu_e m_2 g \cos\beta$$

$$|F_{R_1} + F_{R_2}| = |g\left(m_2 \sin\beta - m_1 \sin\alpha\right)|$$

$$\leq |F_{R_1}| + |F_{R_2}| \leq \mu_e m_1 g \cos\alpha + \mu_e m_2 g \cos\beta$$

$$\boxed{|g\left(m_2 \sin\beta - m_1 \sin\alpha\right)| \leq \mu_e g \left(m_1 \cos\alpha + m_2 \cos\beta\right)}$$

(b) $m_1 = 1\,kg$ $\quad \alpha = 60°$ $\quad 0{,}134 \leq 0{,}669$

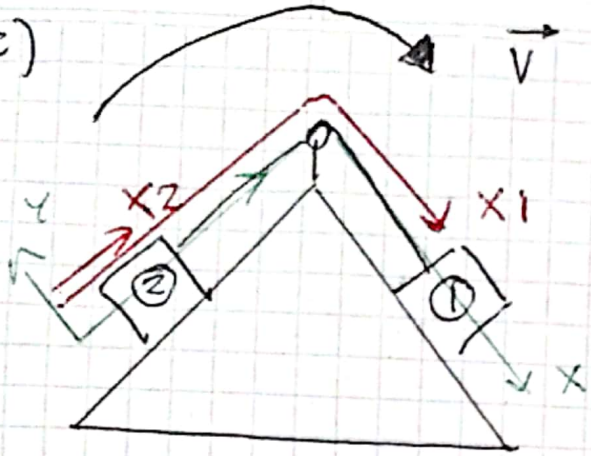
$m_2 = 2\,kg$ $\quad \beta = 30°$ $\quad$ Reposo ✓

Si $\quad m_1 = m_2$ $\quad 0 \leq \mu_e g \left(m_1 \cos\alpha + m_2 \cos\beta\right)$

$\alpha = \beta$

cierto $\forall \mu_e$

(c)

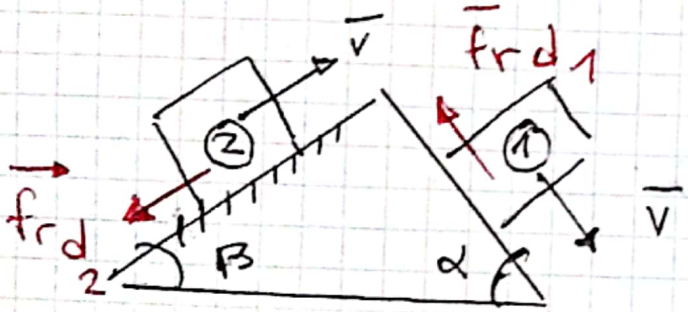


$$|fr_d| = \mu_d |N|$$

$$L = x_1 - x_2 = cte$$

$$\ddot{x}_1 = \ddot{x}_2 = \ddot{x}$$

(1) $$-T + m_1 g \sin\alpha - \mu_d m_1 g \cos\alpha = m_1 \ddot{x}$$



(2) $$T - m_2 g \sin\beta - \mu_d m_2 g \cos\beta = m_2 \ddot{x}$$

$$\ddot{x} = \frac{g}{m_1 + m_2}\left[(m_1 \sin\alpha - m_2 \sin\beta) - \mu_d (m_1 \cos\alpha + m_2 \cos\beta)\right]$$

$$\ddot{x} \cong -2{,}26 \ m/s^2 < 0$$ se desacelera