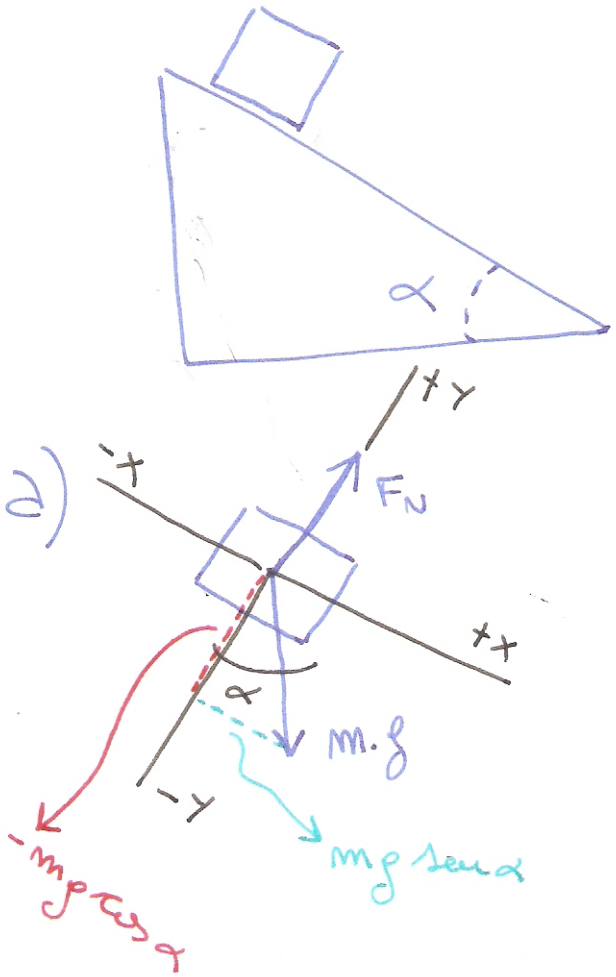
Ejercicio 11 Dinamica (Parte 1)



a) $\vec{F}_N = (0 ; F_N)$

$\vec{mg} = (+mg\sin\alpha ; -mg\cos\alpha)$

$$\Sigma F_x = m a_x \Rightarrow \cancel{m} g \sin\alpha = \cancel{m} a_x$$

$$\Sigma F_y = 0 \Rightarrow F_N - mg\cos\alpha = 0$$

$$\boxed{a_x = g\sin\alpha}$$

b) - aceleración mínima cuando $\alpha = 0°$ (Plano horizontal) $\alpha = 0$

$$a_x = g \cdot \underbrace{\sin 0}_{0} \Rightarrow \boxed{a_x = 0}$$

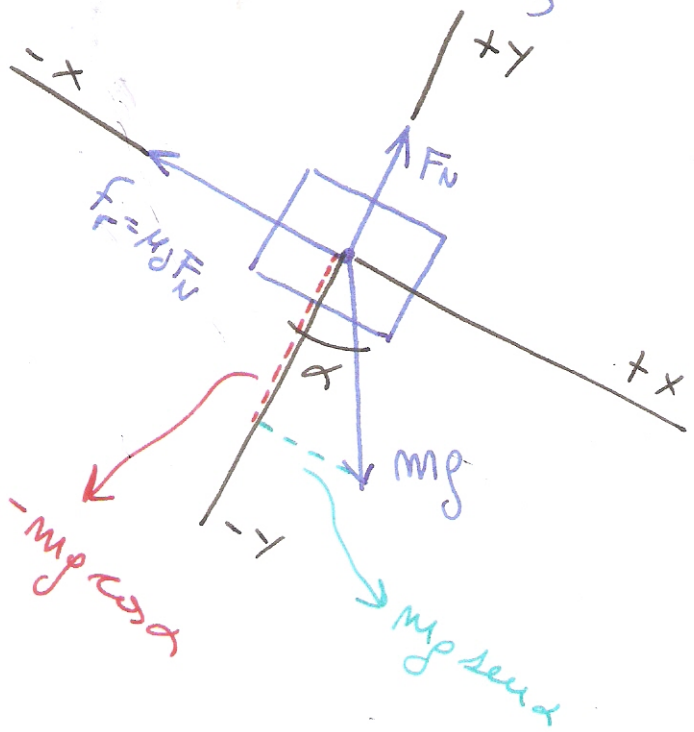
- aceleración máxima cuando $\alpha = 90°$ (Plano vertical)

$\alpha = 90°$

$$a_x = g \underbrace{\sin 90}_{1} \Rightarrow \boxed{a_x = g}$$ CAIDA LIBRE!!!

Ejercicio 11 Dinamica (Parte 2)

c) ahora existe rozamiento



$$\vec{F}_N = (0 ; F_N)$$

$$\vec{mg} = (+mg\sin\alpha ; -mg\cos\alpha)$$

$$\vec{f}_r = (-\mu_d F_N ; 0)$$

$$\sum F_x = ma_x \Rightarrow \begin{cases} mg\sin\alpha - \mu_d F_N = m a_x \quad (1) \\ \sum F_y = ma_y \Rightarrow F_N - mg\cos\alpha = 0 \quad (2) \end{cases}$$

de (2) $\boxed{F_N = mg\cos\alpha}$ (3)

reemplazando (3) en (1)

$$mg\sin\alpha - \mu_d \cdot mg\cos\alpha = m a_x$$

$$a_x = g\sin\alpha - \mu_d g\cos\alpha$$

$$\boxed{a_x = g(\sin\alpha - \mu_d \cdot \cos\alpha)}$$