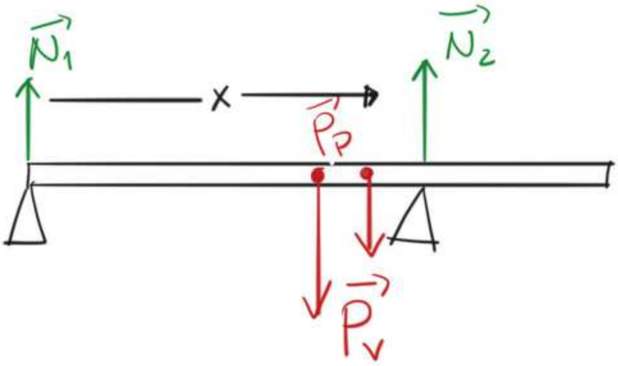
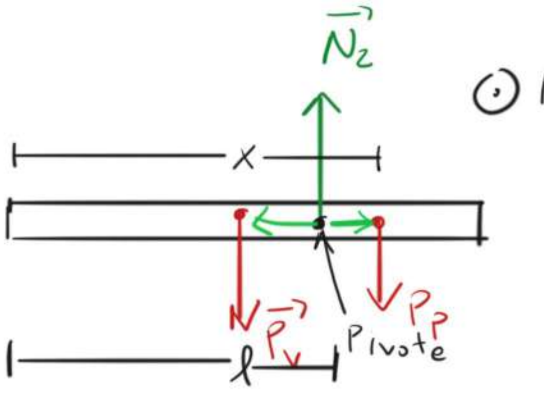
Práctico 3

14





b) $\sum \vec{F}_{ext}$: $N_2 - P_v - P_p = 0 \Rightarrow N_2 = P_v + P_p$

$\vec{\tau}_{N_2} = 0 \times N_2(\hat{k}) \quad \vec{\tau}_{P_v} = \left(\ell - \frac{L}{2}\right) Mg\hat{k} \quad ; \quad \vec{\tau}_{P_p} = (x-\ell)\, mg\,(-\hat{k})$

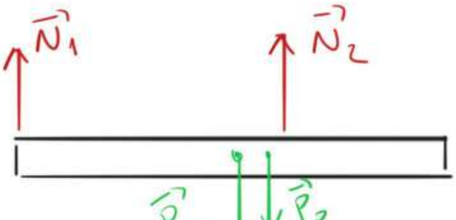
$$0 = \tau_{P_v} - \tau_{P_p} + \tau_{N_2} = \left(\ell - \frac{L}{2}\right)Mg - (x-\ell)\,mg + 0 \quad (*)$$

$$\tau_{P_p} > \tau_{P_v} \Rightarrow \left(\ell - \frac{L}{2}\right)Mg > (x-\ell)\,mg$$

$$\left(\ell - \frac{L}{2}\right)\frac{M\cancel{g}}{m\cancel{g}} > (x-\ell)$$

$$\ell + \left(\ell - \frac{L}{2}\right)\frac{M}{m} > x$$

a)



$$N_1 + N_2 - P_v - P_p = 0$$

$$\vec{\tau}_{N_1} + \vec{\tau}_{N_2} + \vec{\tau}_{P_v} + \vec{\tau}_{P_p} = 0$$

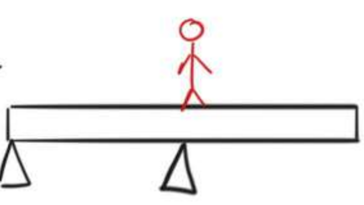
Justo antes del giro: $N_1 = 0 \Rightarrow N_2 = P_v + P_p$

$$= Mg + mg$$

$$N_2 = (M+m)g$$

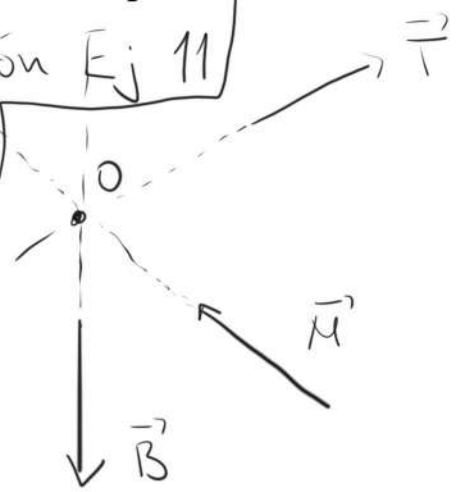
↑ no depende de ℓ!!

Caso particular

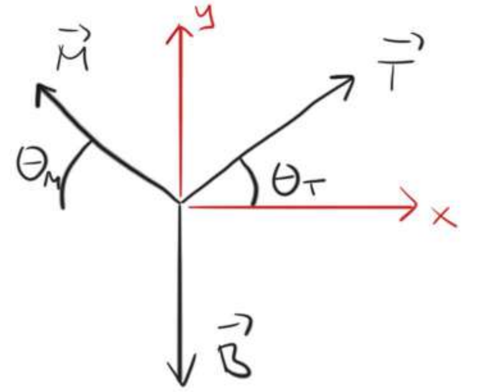


$\ell = \frac{L}{2}$

Discusión Ej 11 Práctico 3



$$\vec{\tau}_T + \vec{\tau}_M + \vec{\tau}_B = 0$$

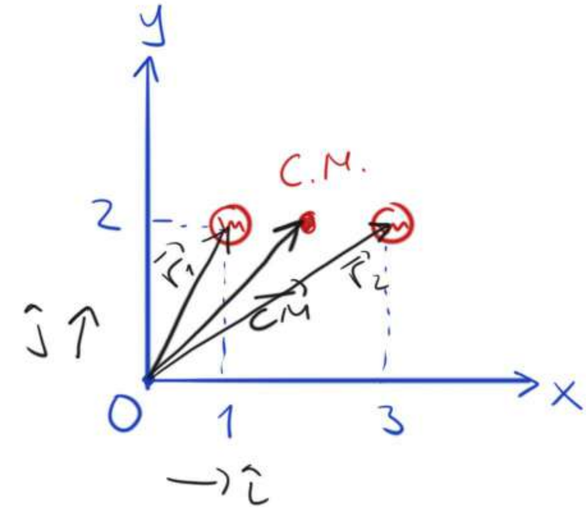


$$\sum \vec{F}_{ext}:$$

$$\sum F_x = T\cos\theta_T - M\cos\theta_M = 0$$

$$\sum F_y = T\operatorname{sen}\theta_T + M\operatorname{sen}\theta_M - B = 0$$

Ejemplo sencillo de cálculo del centro de masas

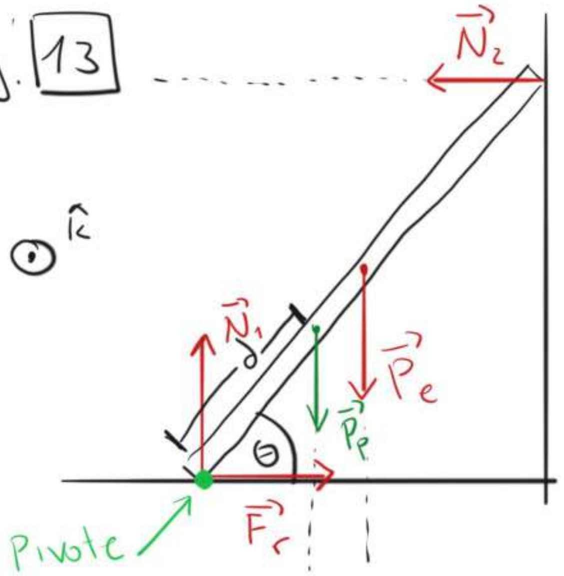


$$\vec{CM} = \frac{m\vec{r}_1 + m\vec{r}_2}{m+m}$$

$$= \frac{m(1\hat{i} + 2\hat{j}) + m(3\hat{i} + 2\hat{j})}{2m}$$

$$= \frac{4m\hat{i} + 4m\hat{j}}{2m} = 2\hat{i} + 2\hat{j}$$

Ej. $\boxed{13}$



$$\sum F_x = F_r - N_2 \Rightarrow N_2 = F_r = \mu N_1$$

$$\sum F_y = N_1 - P_e - P_p \Rightarrow N_1 = P_p + P_e$$

$$\vec{\tau}_{N_2} + \vec{\tau}_{P_p} + \vec{\tau}_{P_e} = 0 \quad \left\{ \begin{array}{l} P_e = m_e g \\ P_p = m_p g \end{array} \right.$$

$$\vec{\tau}_{N_2} = L \operatorname{sen}\theta \, N_2 \, \hat{k}$$

$$\vec{\tau}_{P_p} = d\cos\theta \, P_p(-\hat{k}); \quad \vec{\tau}_{P_e} = \frac{L}{2}\cos\theta \, P_e(-\hat{k})$$