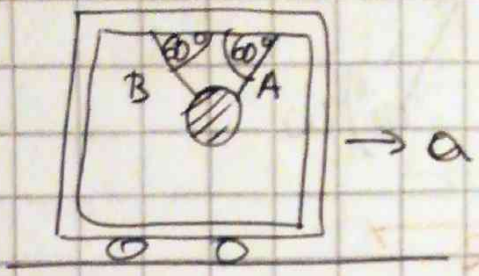
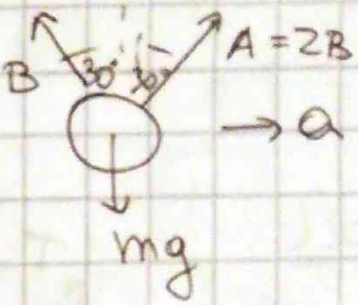
Francisco Zamorano

Taller 3 - Secciones 7 y 8

Problema 1



DCL



$$\sum F_x = ma_x$$
$$2B\sin 30 - B\sin 30 = ma$$

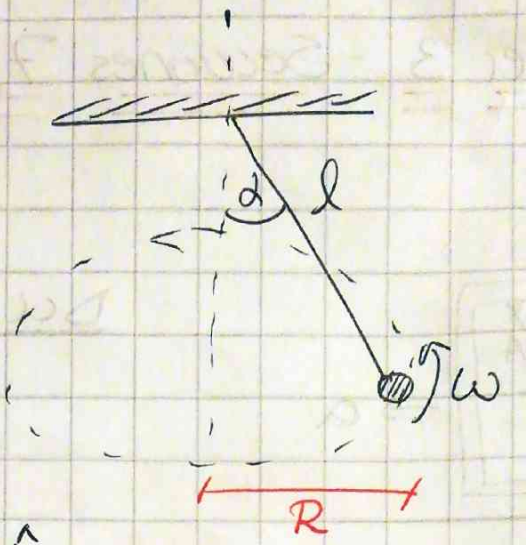
$$\sum F_y = 0$$
$$2B\cos(30) + B\cos(30) - mg = 0$$
$$B(2\cos(30) + \cos(30)) = mg$$
$$\boxed{B = \frac{mg}{2\cos(30) + \cos(30)}}$$

Reemplazando Arriba

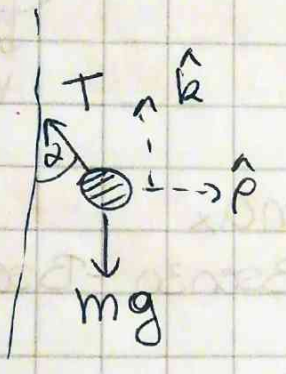
$$\Rightarrow a = \frac{\frac{2mg}{2\cos(30)+\cos(30)}\cdot \sin(30) - \frac{mg}{2\cos 30 + \cos 30}}{m}$$

$$\boxed{a = \frac{g}{3\sqrt{3}}}$$

Problema 2



DCL



En $\hat{\rho}$: $\vec{a} = -R\omega^2 \hat{\rho}$

$\vec{a} = -l\,\mathrm{sen}\alpha \cdot \omega^2$

$\sum F \rightarrow \vec{F} = (T\cos(\alpha) - mg)\hat{k} - T\,\mathrm{sen}(\alpha)\hat{\rho}$

$\vec{F} = m\vec{a}$

$\Rightarrow (T\cos\alpha - mg)\hat{k} - T\,\mathrm{sen}(\alpha)\hat{\rho} = -ml\,\mathrm{sen}\alpha\,\omega^2\hat{\rho}$

Igualamos sólo $\hat{\rho}$ con $\hat{\rho}$ y $\hat{k}$ con $\hat{k}$

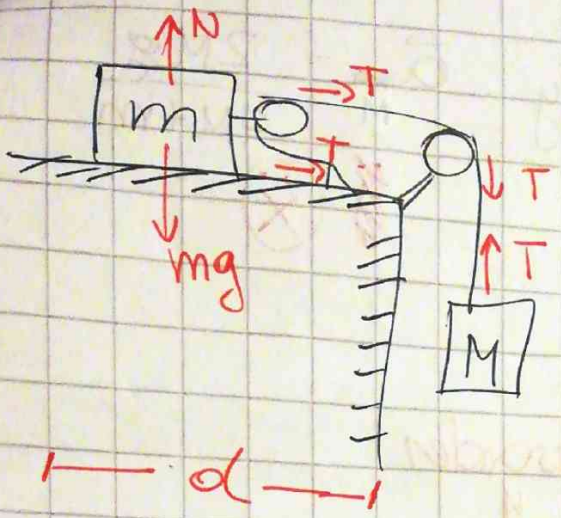
$\Rightarrow T\cos(\alpha) = mg$

$T\,\mathrm{sen}(\alpha) = ml\,\mathrm{sen}(\alpha)\omega^2$ $\rightarrow$ $\boxed{T = ml\omega^2}$

$\Rightarrow \cos(\alpha) = \dfrac{mg}{ml\omega^2}$

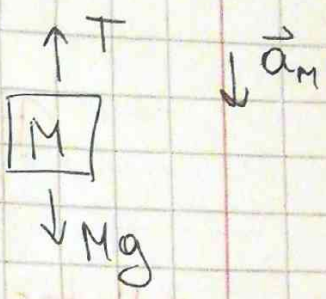
$\boxed{\alpha = \arccos\left(g/l\omega^2\right)}$

ma 3



¿Aceleración de M?

DCL M:



$\Sigma F_y = Ma$

$\boxed{Mg - T = Ma_M}$ (1)

DCL m:

$\vec{a}_m \rightarrow$

$\boxed{m} \longrightarrow 2T$ $\quad \boxed{2T = m\vec{a}_m}$

* Como es la misma cuerda,

$$\vec{a}_M = 2\vec{a}_m$$

(1) $\Rightarrow$ $Mg - T = MA_m$

$T = Mg - MA_m$

en (2) $\Rightarrow$ $2Mg = mA_m + 2MA_m$

$$2(Mg - MA_m) = m\,a_m$$

Usando la equivalencia de aceleraciones

$\Rightarrow \vec{a}_M = \frac{4Mg}{4M+m}$ y $\vec{a}_m = \frac{2Mg}{4M+m}$

Perdón por el desorden en esta última :(

* Notar que si se toma el eje de referencia al revés, algunos signos dan cambiados