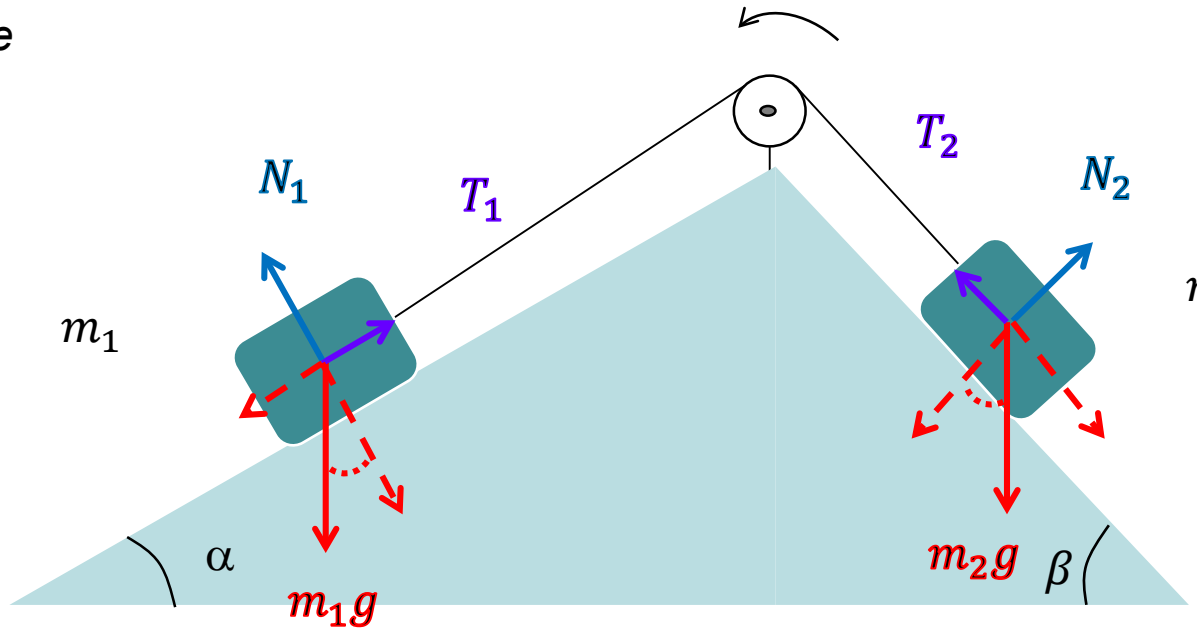
Si la massa de la corda és negligible

$T_1 \cong T_2$



$\mu = 0$

$N_1 = m_1 g \cos\alpha$

$m_1 g \sin\alpha - T = m_1 a$

$N_2 = m_2 g \cos\beta$

$T - m_2 g \sin\beta = m_2 a$

$$a = \frac{m_1 \sin\alpha - m_2 \sin\beta}{m_1 + m_2} g$$

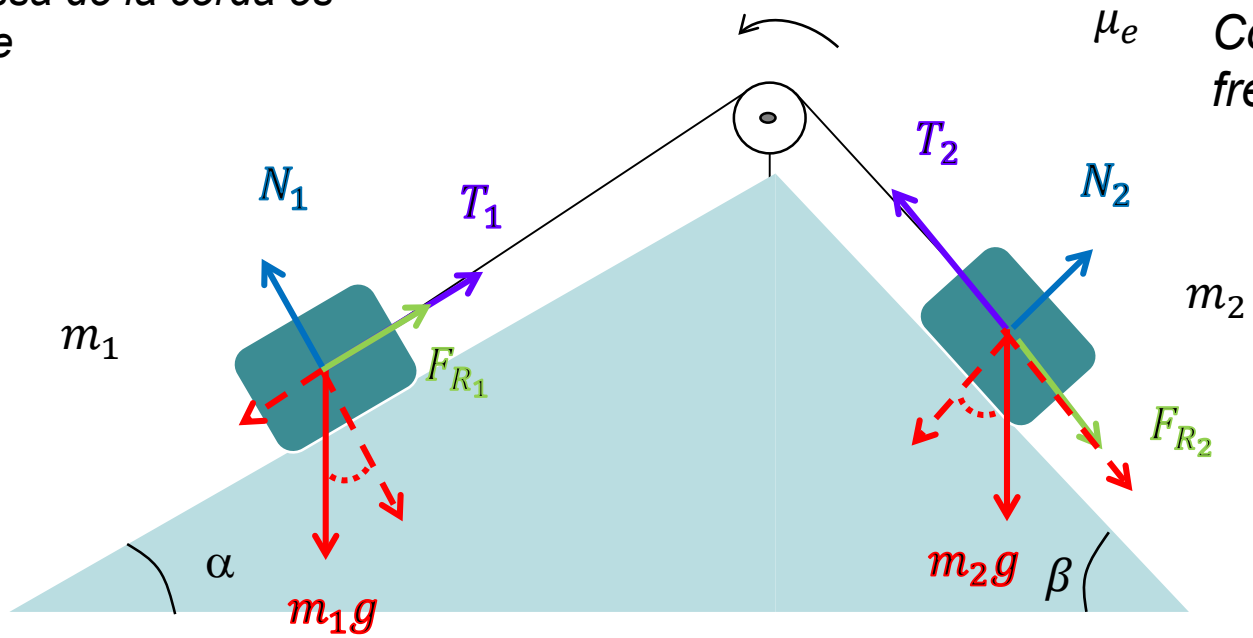
- *Si es major que zero es mou*
- *Si es zero no es mou*
- *Si es menor que zero es mou en sentit contrari*

$T - m_1 g \sin\alpha = m_1 a$

$m_2 g \sin\beta - T = m_2 a$

Si la massa de la corda és negligible

$T_1 \cong T_2$



Coeficient de fregament estàtic

$N_1 = m_1 g\cos\alpha$

$m_1 g\sin\alpha - F_{R_1} - T = m_1 a$

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

$m_1 g\sin\alpha - \mu_e m_1 g\cos\alpha - T = m_1 a$

$N_2 = m_2 g\cos\beta$

$T - m_2 g\sin\beta - F_{R_2} = m_2 a$

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

$T - m_2 g\sin\beta - \mu_e m_2 g\cos\beta = m_2 a$

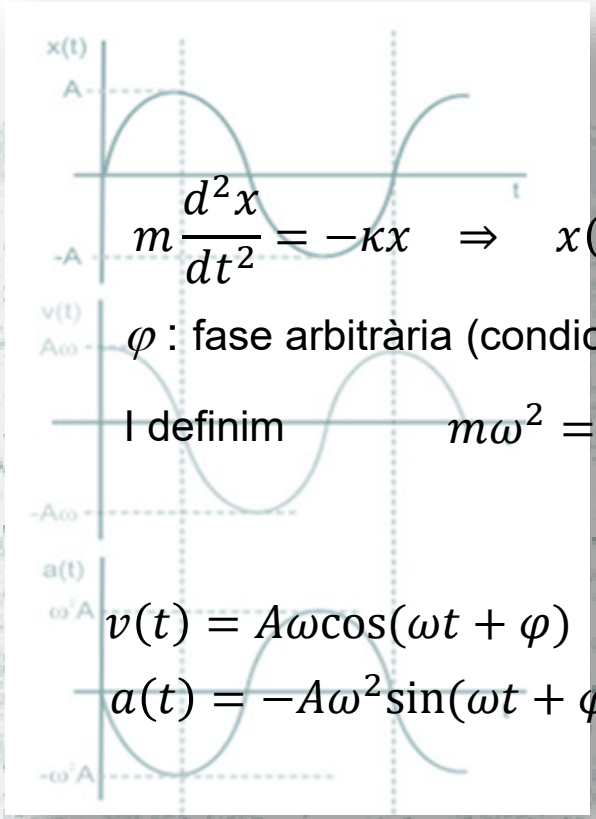
$$a = \frac{m_1\sin\alpha - m_2\sin\beta - \mu_e(m_1\cos\alpha + m_2\cos\beta)}{m_1 + m_2} g$$

- *Si es major que zero es mou*
- *Si es zero no es mou*
- *Si es menor que zero cal repetir els càlculs en l'altre sentit de gir*

Llei de Hooke [*molles ideals*] (1678)

$F = -\kappa x$ Força recuperadora

κ : Constant recuperadora (característica de la molla)



$$m\frac{d^2x}{dt^2} = -\kappa x \quad \Rightarrow \quad x(t) = A\sin(\omega t + \varphi)$$

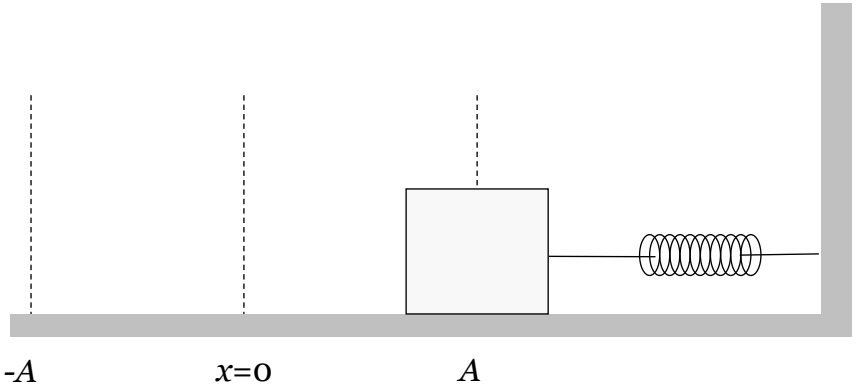
Moviment Harmònic Simple

φ : fase arbitrària (condició inicial)

I definim $m\omega^2 = \kappa$

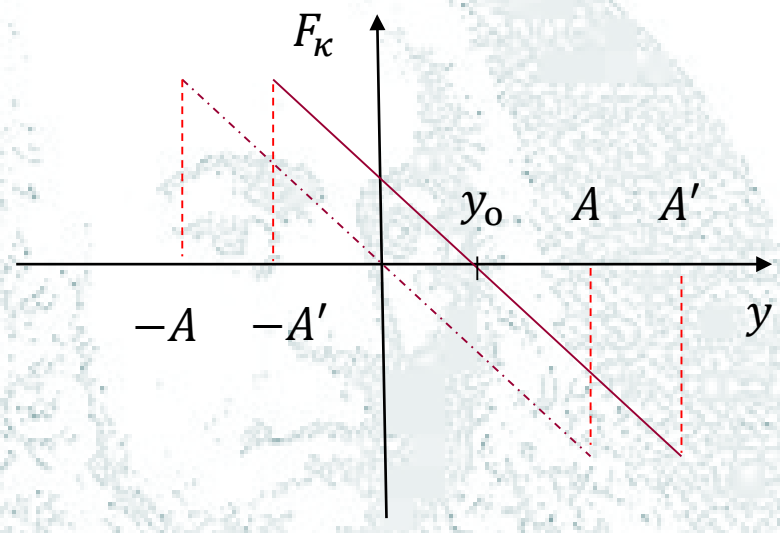
$$v(t) = A\omega\cos(\omega t + \varphi)$$

$$a(t) = -A\omega^2\sin(\omega t + \varphi)$$



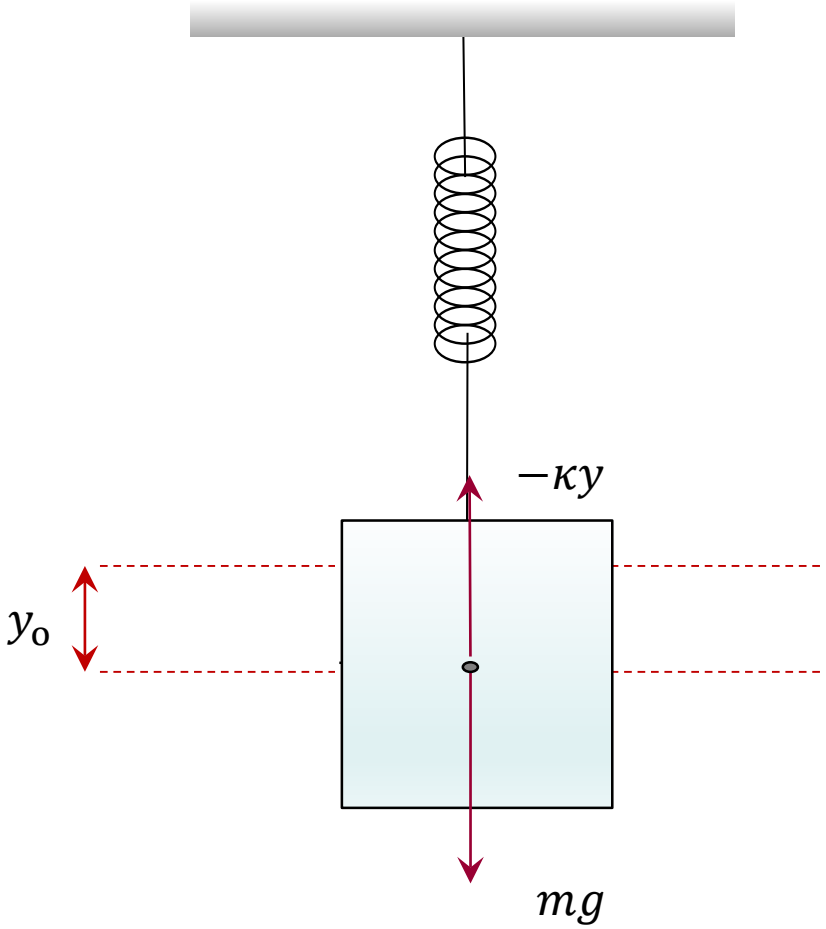
Llei de Hooke

$$-\kappa y_o + mg = 0 \quad \Rightarrow \quad y_o = \frac{mg}{\kappa}$$



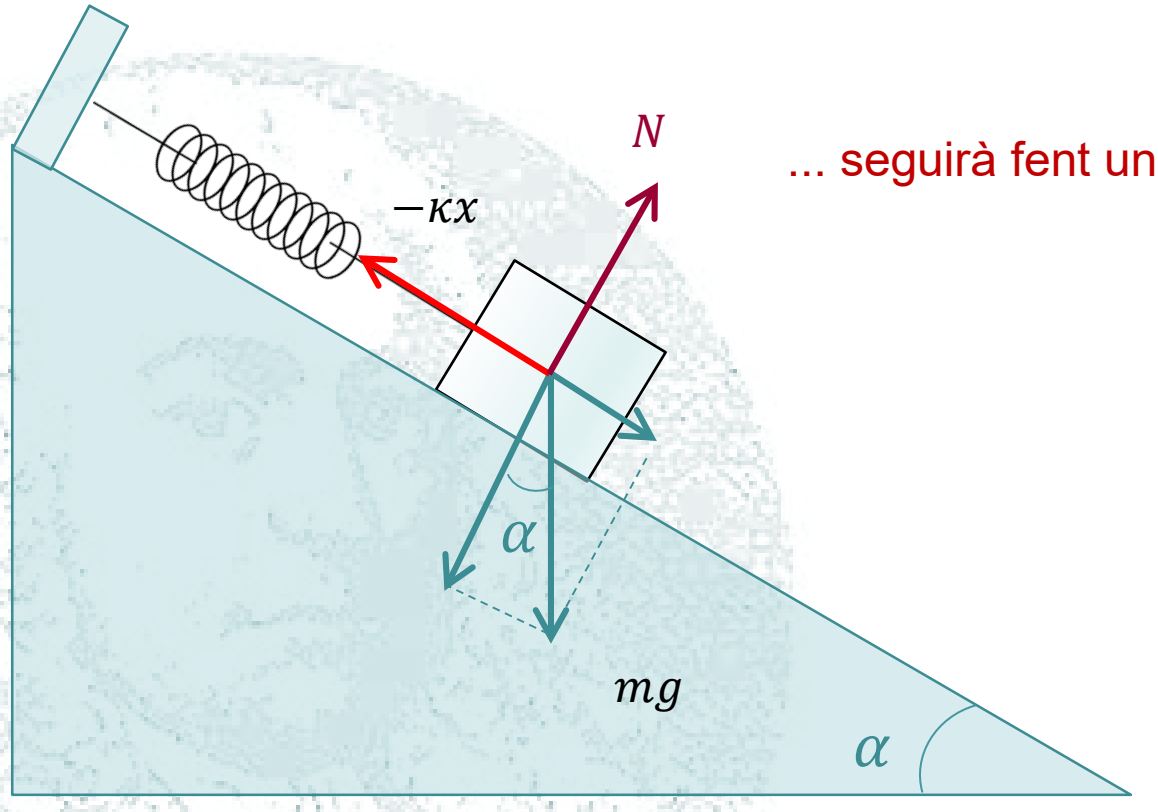
$$y(t) = A\sin(\omega t + \varphi)$$

Al voltant de y_o



$$F_{tot} = -\kappa y + mg$$

Llei de Hooke

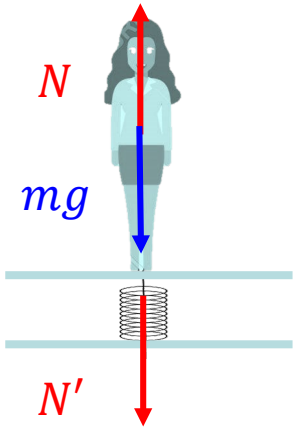


Si hi ha fregament ...

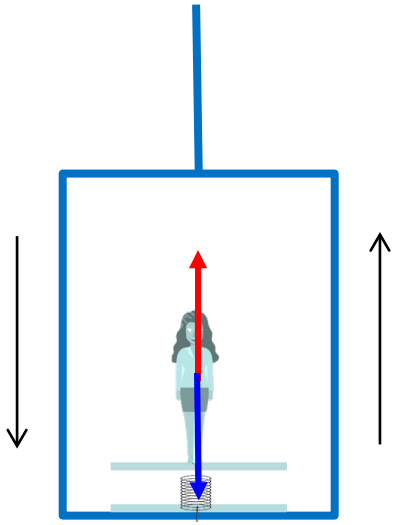
... seguirà fent un moviment harmònic simple?

$\pm\mu mg\cos\alpha$

Com es mesura el pes?



$$N' = mg = -\kappa y$$



$$N - mg = ma_{\uparrow}$$
$$N' = mg + ma_{\uparrow}$$

$$mg - N = ma_{\downarrow}$$
$$N' = mg - ma_{\downarrow}$$

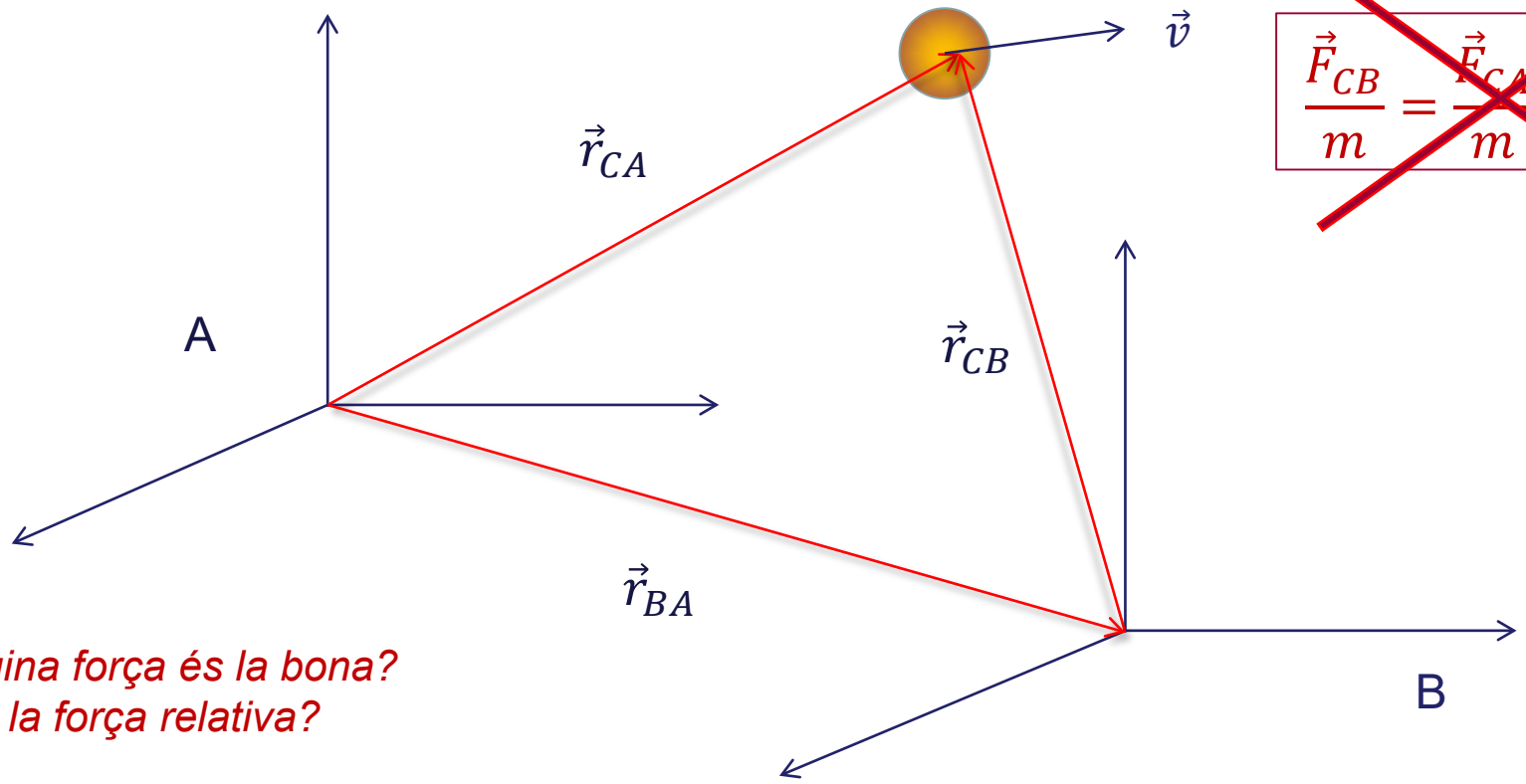
$[N'_{mín} = 0]$

Moviment relatiu

SISTEMES INERCIALS: sistemes on es satisfan les lleis de Newton

$$\vec{r}_{CB} = \vec{r}_{CA} - \vec{r}_{BA}$$
$$\vec{v}_{CB} = \vec{v}_{CA} - \vec{v}_{BA}$$
$$\vec{a}_{CB} = \vec{a}_{CA} - \vec{a}_{BA}$$

$$\frac{\vec{F}_{CB}}{m} = \frac{\vec{F}_{CA}}{m} - \vec{a}_{BA}$$



Quina força és la bona?
És la força relativa?

Moviment circular

$$T_1 + mg = m\frac{{v_1}^2}{R}$$

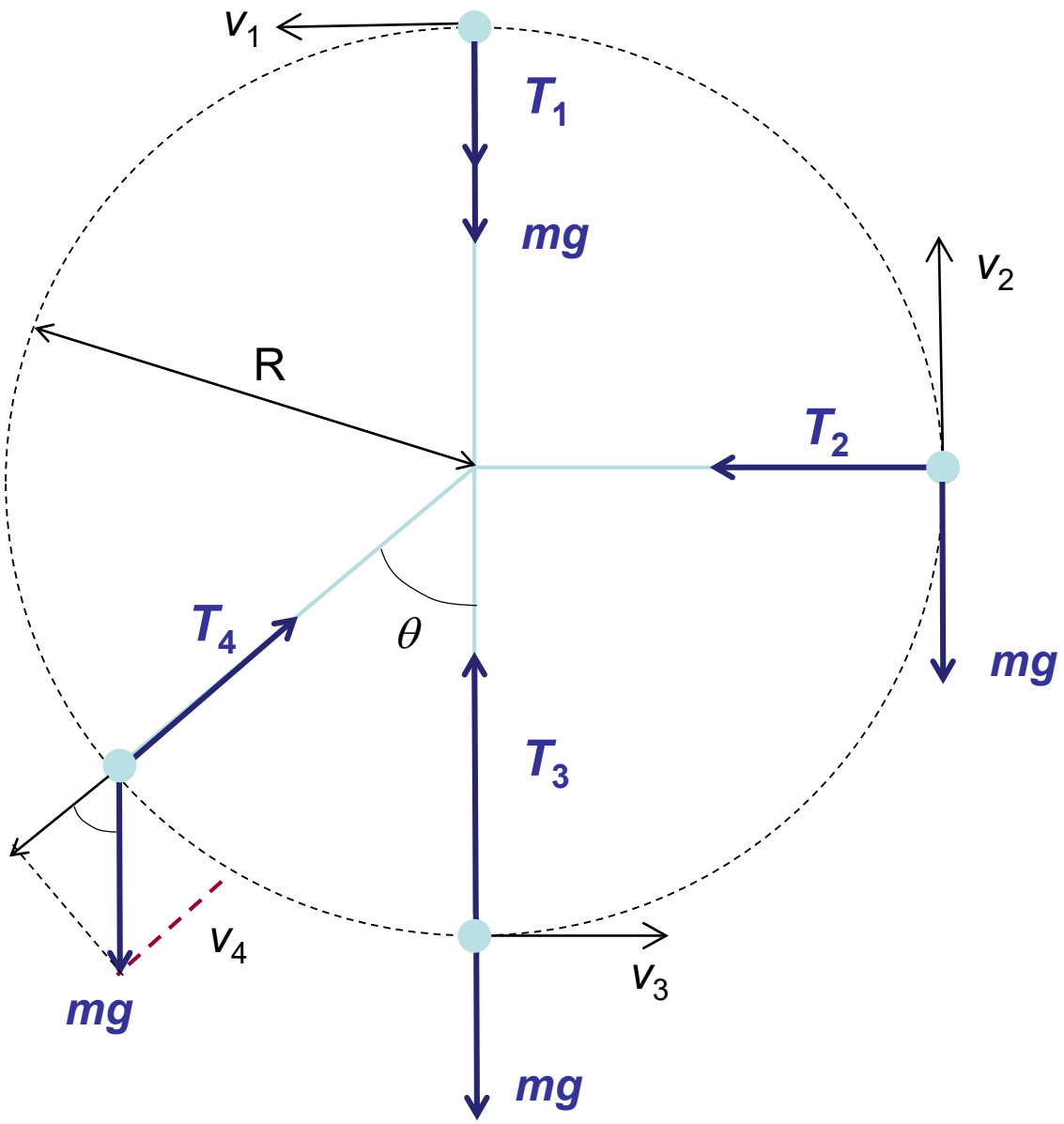
$$T_2 = m\frac{{v_2}^2}{R}$$

$$T_3 - mg = m\frac{{v_3}^2}{R}$$

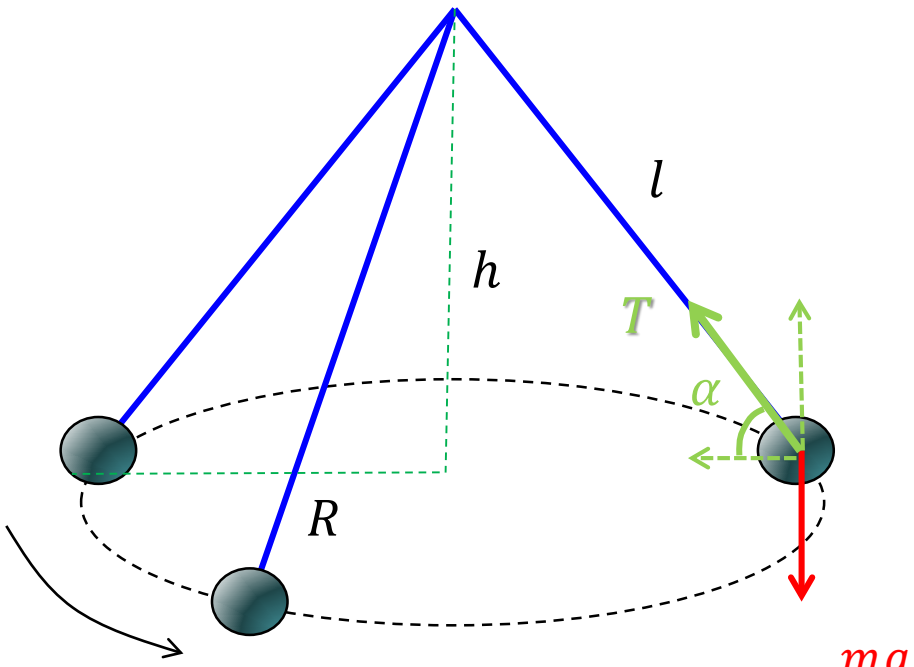
$$T_4 - mg\cos\theta = m\frac{{v_4}^2}{R}$$

$$mg\sin\theta = ma_t$$

[Si no posem alguna altra força no serà un moviment circular uniforme]



Moviment circular. Pèndol cònic



$$T\,\sin\alpha = mg$$

$$T\,\cos\alpha = m\frac{v^2}{R}$$

$$\tan\alpha = \frac{gR}{v^2} = \frac{h}{R}$$

$$v^2 = \frac{gR^2}{\sqrt{l^2 - R^2}}$$

$$\omega^2 = \frac{g}{\sqrt{l^2 - R^2}}$$