TALLER 6

13.14

→ Choque elástico.

$\rightarrow \Delta p = 0 \longrightarrow \quad p_0 = 0 \quad ; \quad p_f = M v_1 - 2M v_2$

$\Delta E = 0$

$$v_1 = 2 v_2 \rightarrow v_2 = \frac{1}{2} v_1$$

$$\Delta E = 0$$

$$-G\frac{M(2M)}{12R} = \frac{1}{2} M v_1^2 + \frac{1}{2}(2M) v_2^2 - G\frac{M(2M)}{4R}$$

$$G\frac{(M)(2M)}{4R}\left(1 - \frac{1}{3}\right) = M v_1^2 \left(\frac{1}{2} + \frac{1}{4}\right)$$

$$\frac{2}{3} G \frac{M^2}{4R} = \frac{3}{4} M v_1^2 \rightarrow \frac{4}{9} G \frac{M}{R} = v_1^2$$

$v_1 = \frac{2}{3}\sqrt{\frac{GM}{R}}$. $v_2 = \frac{1}{3}\sqrt{\frac{GM}{R}}$

14.46

$A_1 = 40\,m^2$

$P_i = 7\times10^4\,P_a$

$m = 1.6\times10^6\,kg$

$\Sigma F_y = 0$

$mg = (P_i - P_s)A_T$

$A_T = 2A_1$

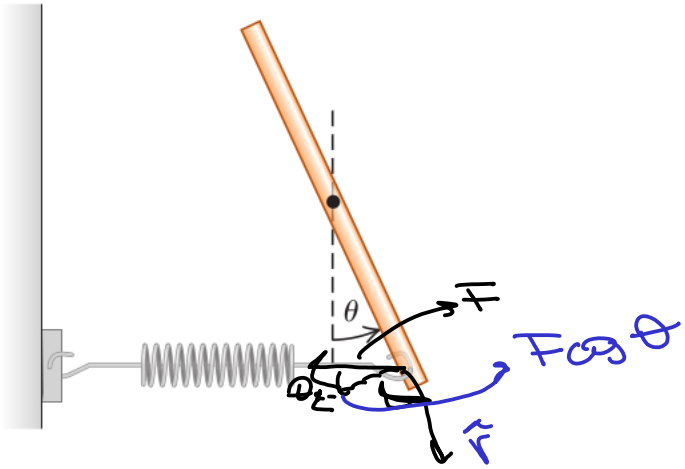
$P_s = P_i - \frac{mg}{2A_1}$

$P_s = 6.8\times10^4\,P_a$

HT3

$\Sigma \tau_O = -k\left(\frac{L}{2}\right)\operatorname{sen}\theta\left(\frac{L}{2}\right)\cos\theta$ (k)

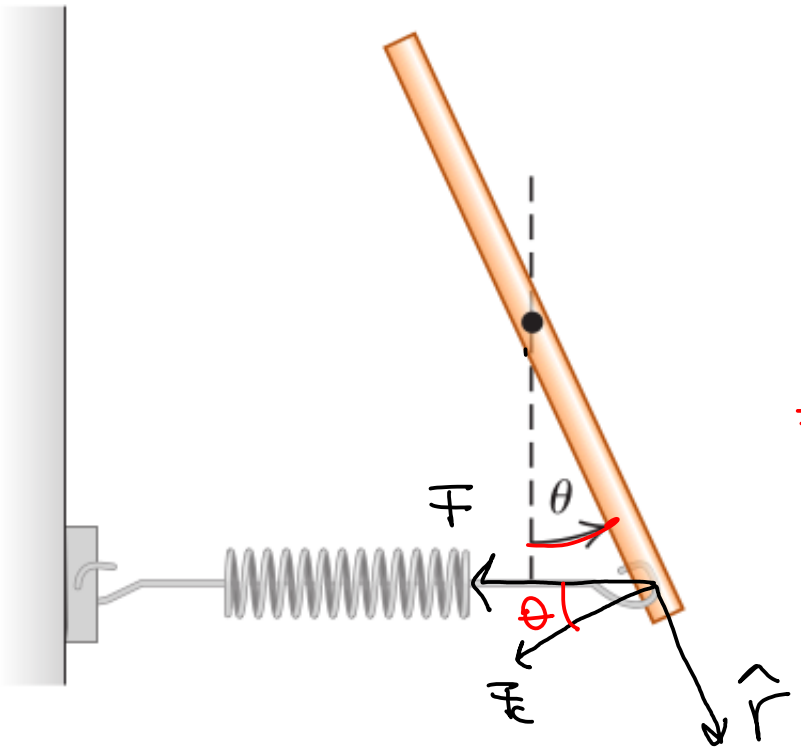
P21



$\operatorname{sen}(90+\theta)$

$= \operatorname{sen}(90)^{1}\cos\theta$

$+ \operatorname{sen}(\theta)\cos(90)^{0}$



$\tau_c = F \cdot r\theta$

$\tau_o = I_{cm}\alpha = I_{cm}\ddot{\theta}$

$\hookrightarrow \frac{1}{12}ML^2$

$-k\left(\frac{L}{2}\right)\sin\theta\left(\frac{L}{2}\right)\cos\theta = \frac{1}{12}ML^2\ddot{\theta}$

$\sin\theta \sim \theta$, $\cos\theta \sim 1$, $\frac{1}{12} = \frac{1}{3}$

$-k\theta = \frac{1}{3}M\ddot{\theta}$

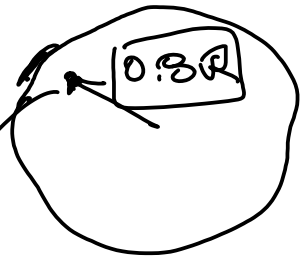
$\ddot{\theta} = -\frac{3k}{M}\theta \rightarrow \ddot{\theta} + \frac{3k}{M}\theta = 0$

ω^2

$T = 2\pi\sqrt{\frac{M}{3k}}$

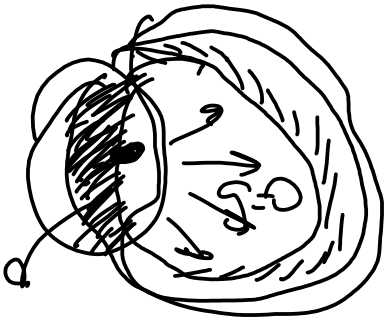
$g < 9.8$

4)

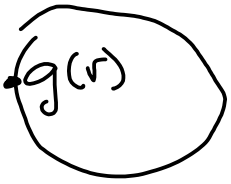


$g = 9.8\ m/s^2$ en la sup.

$g < 9.8$



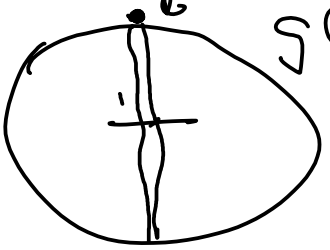
$g < 9.8$



Si lo consideramos.

$$g(r) = \frac{GM}{R_T^3} \quad 0 \le r \le R_T$$

(P) → uniforme



$$m\ddot{r} = -mg(r)$$

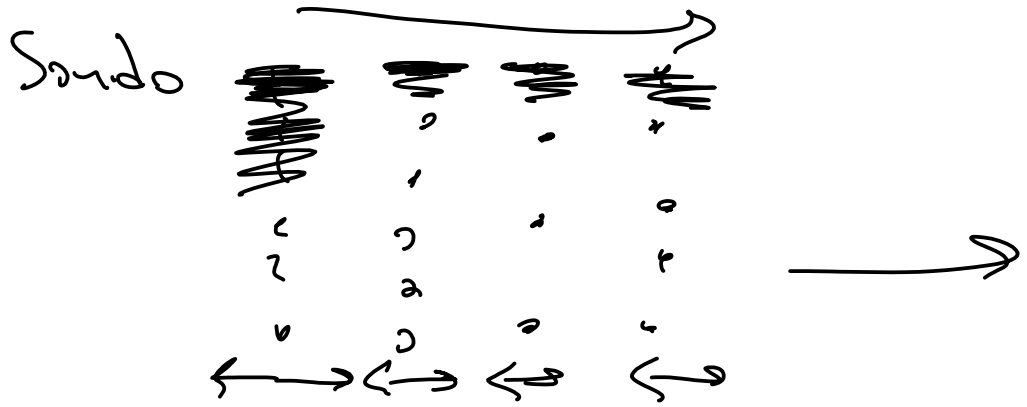
$$\ddot{r} = -\frac{GM}{R_T^3} r$$

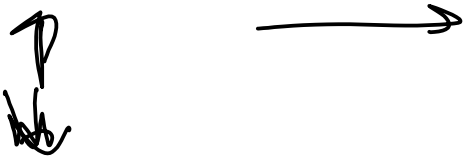
ω^2

$$T = 2\pi\sqrt{\frac{R^3}{GM}}$$

$$T/2 = 42.18\ \text{min}.$$

Onda Longitudinal





Sol. MAS $\rightarrow y(t) = A\operatorname{sen}(\omega t + \sigma)$

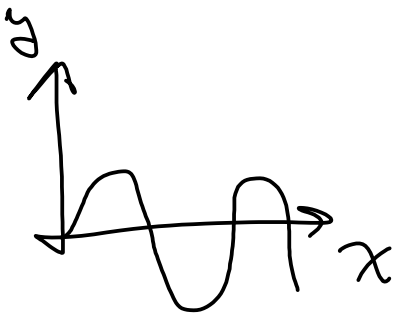
Onda

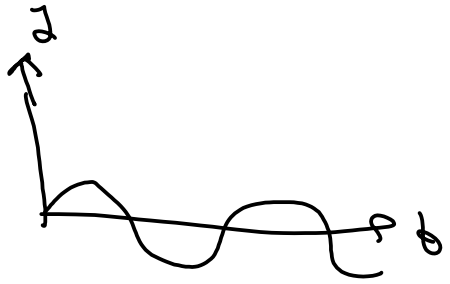
$$y(x,t) = A\operatorname{sen}(kx - \omega t)$$

x punto en el espacio.

t Fotograma

$$\vec{k} = \frac{2\pi}{\lambda}$$



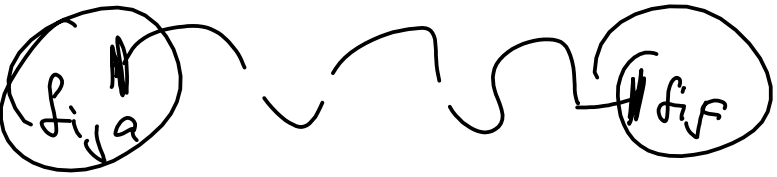


y punto

$$\frac{\partial^2 y}{\partial x^2} = \frac{1}{v^2}\frac{\partial^2 y}{\partial t^2}$$

$\Rightarrow$ Ecuación de onde 1D.

Condiciones de frontera ← C.I.



Modos normales

Todo onda es la combinación lineal de sus modos normales. $\{\sin(\omega t), \cos(\omega t)\}$ Series de Fourier.