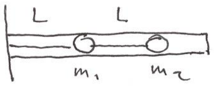
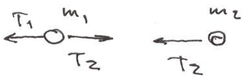
Fi 21A C.1 P.2 P. Aceituno



Ambas partículas se mueven en trayectoria circular con velocidad constante

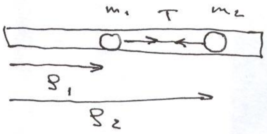


$$\boxed{T_2 = \frac{m_2 (\omega_0 2L)^2}{2L} = 2 m_2 \omega_0^2 L}$$

$$T_1 - T_2 = \frac{m_1 (\omega_0 L)^2}{L} \longrightarrow T_1 = 2 m_2 \omega_0^2 L + m_1 \omega_0^2 L$$

$$\boxed{T_1 = (2 m_2 + m_1)\omega_0^2 L}$$

La cuerda se corta ...



$$m_1 (\ddot{\rho}_1 - \rho_1 \omega_0^2) = T \quad (1)$$

$$m_2 (\ddot{\rho}_2 - \rho_2 \omega_0^2) = -T \quad (2)$$

Mientras la cuerda se mantenga tensa $\rho_2 = \rho_1 + L$

$$\ddot{\rho}_2 = \ddot{\rho}_1$$

$(1)+(2)$: $$(m_1 + m_2)\ddot{\rho}_1 - m_1 \rho_1 \omega_0^2 - m_2(\rho_1 + L)\omega_0^2 = 0$$

$$\ddot{\rho}_1 = \omega_0^2 \rho_1 + \frac{m_2 L \omega_0^2}{m_1 + m_2}$$

$$\rho_1(t) = A e^{\omega_0 t} + B e^{-\omega_0 t} + \frac{m_2 L}{m_1 + m_2}$$

C.I $(t=0)$ $\left.\begin{array}{l} \rho_1 = L \\ \dot{\rho}_1 |_{t=0} = 0 \end{array}\right\} \rightarrow$ $L = A + B - \frac{m_2 L}{m_1 + m_2}$

$$0 = \omega_0 A - \omega_0 B$$

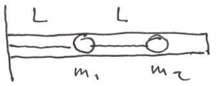
$$A = \frac{m_1}{m_1 + m_2} \frac{L}{2} = B$$

$$\therefore \boxed{\rho_1(t) = \frac{m_1 L}{(m_1 + m_2)} \left(\frac{e^{\omega_0 t} + e^{-\omega_0 t}}{2}\right) + \frac{m_2 L}{m_1 + m_2}}$$

$(1)-(2)$ $$2T = (m_1 - m_2)\ddot{\rho}_1 + m_2(\rho_1 + L)\omega_0^2 - m_1 \rho_1 \omega_0^2$$

$$2T = \frac{2 m_1 m_2 L \omega_0^2}{m_1 + m_2} \longrightarrow \boxed{T = \frac{m_1 m_2}{m_1 + m_2} L \omega_0^2 > 0}$$

LA CUERDA NUNCA SE SUELTA !!



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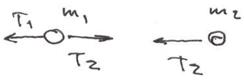

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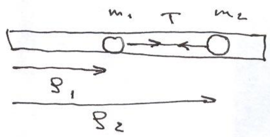

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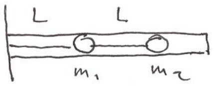

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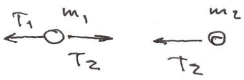

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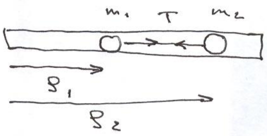

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