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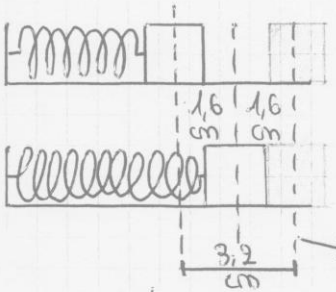
$m = 0{,}60\ kg$ — DISTEMA MASSA-MOLLA

$k = 26\ N/m$ — MOTO ARMONICO SEMPLICE

$x = 3{,}2\ cm = 0{,}032\ m$ — CONSERVAZIONE DELL'ENERGIA MECCANICA



A (posizione iniziale)

B (posizione con $x_B = 1{,}6\ cm$)

POSIZIONE DI EQUILIBRIO (in questa posizione l'energia potenziale elastica è nulla)

$E_{mA} = E_{mB}$

$U_A + K_A = U_B + K_B$ — $\frac{1}{2} x_A = x_B$

$$\frac{1}{2} k x_A^2 + \cancel{\frac{1}{2} m v_A^2} = \frac{1}{2} k x_B^2 + \frac{1}{2} m v_B^2$$

$$\frac{1}{2}(26\ N/m)(0{,}032\ m)^2 + 0 = \frac{1}{2}(26\ N/m)(0{,}016\ m)^2 + \frac{1}{2}(0{,}60\ kg) v_B^2$$

$$v_B = \sqrt{\frac{2\left(\frac{1}{2}(26 N/m)(0{,}032 m)^2 - \frac{1}{2}(26 N/m)(0{,}016 m)^2\right)}{(0{,}60\ kg)}} = 0{,}22\ m/s$$

COME RICAVARE PROCEDIMENTO:

$$v_B^2 = \frac{\frac{1}{2} k x^2 - \frac{1}{2} k \left(\frac{1}{2} x_A\right)^2}{\frac{1}{2} m}$$

$$v_B^2 = \frac{2 \cdot \frac{1}{2}\left(k x^2 - k \frac{1}{4} x_A^2\right)}{m}$$

$$v_B^2 = \frac{4 k x^2 - k x^2}{4m}$$

$$\rightarrow v_B = \sqrt{\frac{3 k x^2}{4m}}$$

Leggi del moto armonico

$x = A\cos(\omega t)$

$v = -A\omega \sin(\omega t)$

$a = -x\omega^2$

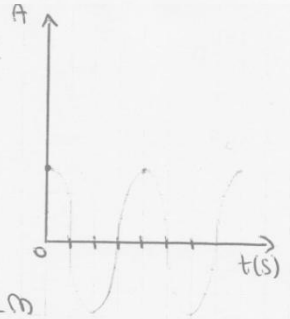
$\omega = \frac{2\pi}{T}$

$T = 2\pi\sqrt{\frac{m}{k}}$

$T = 2\pi\sqrt{\frac{0{,}60}{26}} = 0{,}8\ s$

$x = A\cos\left(\frac{2\pi}{T} t\right)$

$\rightarrow x = A\cos\left(\frac{2\pi}{0{,}8} t\right)$



- $t = 0 \rightarrow x_{max}$ $x = A = 0{,}032\ m$
- $t = \frac{T}{4}$ → tempo per percorrere $x' = A\cos\left(\frac{2\pi}{0{,}8} \frac{0{,}8}{4_2}\right)$
- $t = \frac{T}{2}$ $x'' = A\cos\left(\frac{2\pi}{0{,}8} \frac{0{,}8}{2}\right)$