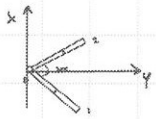
27/04/2018

PROBLEMA 1:



$$\vec{R}_{CM} = \frac{M\vec{R}_{CM}^{(1)} + M\vec{R}_{CM}^{(2)}}{2M}$$

$$\vec{R}_{CM} = \frac{1}{2}\left(\vec{R}_{CM}^{(1)} + \vec{R}_{CM}^{(2)}\right)$$

$$\vec{R}_{CM}^{(2)} = \frac{L}{2}\cos\alpha = \vec{R}_{CM}^{(2)}$$

$$R_{CM} = \frac{1}{2}\left(\frac{L}{2}\cos\alpha + \frac{L}{2}\cos\alpha\right)$$

$$\vec{R}_{CM} = \frac{L}{2}\cos\alpha$$

ESERCIZIO 2:

$$a_c = \frac{v^2}{R}$$

II P.D. $\quad m\cdot\vec{a} = \vec{F}_K$

$$m\frac{v^2}{R} = k|R|$$

$$v = \sqrt{\frac{k}{m}}R$$

2.2) CONSERVAZIONE E. MECCANICA

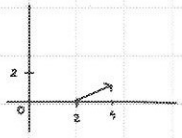
$$\frac{1}{2}mv^2 + \frac{1}{2}kR^2 = 0 + \frac{1}{2}k\left(R^2 + d^2\right)$$

$$kR^2 = \frac{1}{2}k\left(R^2 + d^2\right)$$

$$d = R$$

Ejercicio 2:

$\vec{F} = 4\hat{i} + 2\hat{j}$



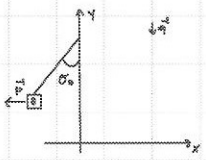
$\vec{M} = \vec{F} \wedge \vec{r}$

$= (4,2) \wedge (2,0)$

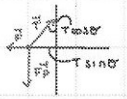
$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 0 & 0 \\ 4 & 2 & 0 \end{vmatrix}$

$= (0,0,4) \quad |\vec{M}| = 4$

ESERCIZIO 4:



4.1)



CONDIZIONE DI EQUILIBRIO: $\sum \vec{F} = 0$

$\sum \vec{M} = 0$

$\vec{P} + \vec{T} + \vec{F}_a = 0 \qquad a = -a\hat{i} \quad a > 0.$

$\hat{x}: \; -F + T\sin\theta = 0$

$\hat{y}: \; T\cos\theta - mg = 0$

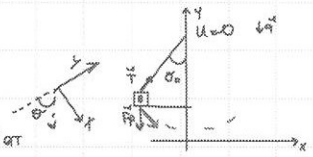
$T = \frac{Mg}{\cos\theta} \qquad F = T\sin\theta$

$F = \frac{Mg}{\cos\theta}\sin\theta \rightarrow F = Mg\tan\theta = \frac{11}{10} g \frac{3}{4}$

$T = \frac{\left(M_B + \frac{1}{10}M_B\right)g}{\cos\theta}$

$T = \frac{11}{10} M_B \frac{1}{\cos\theta} + \frac{11}{5} M_B g$

2.2)



$\vec{x}$: $mg\sin\theta = ma_T$

$\vec{y}$: $T - mg\cos\theta = ma_r$

$\downarrow$

$\vec{a_r} = \left|-\frac{\vec{v}(t)^2}{R}\right| = \frac{v^2}{R}$

$T = mg\cos\theta + m\frac{v^2}{R}$ ⟶ V in funzione di θ.

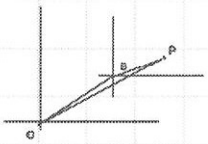
CONSERVAZIONE E. MECCANICA: $E_1 = \frac{1}{2}mv^2 + mgl\cos\theta$

$E_2 = -mg(l\cos\theta)$

2.3) URTO TOTALMENTE ANELASTICO.

$u = \sqrt{\frac{gl}{2}}$

Per la conservazione lungo x $(m_1+m_2)V = m_1v + m_2u$



$(m+m_1)V = m_1V_p + m_1(V_p - u)$

$OP = OB + \vec{BP}$

$\vec{V}_{PO} = \vec{V}_{OB} + \vec{V}_{BP}$

$\vec{V}_{PO} = \vec{V}_{BF} - u$

17/07/2019

Esercizio 1:

ISTANTANEAMENTE → URTO TOTALMENTE ANELASTICO → ΔE non si conserva.

ho solo F_{ext} non impulsive → $\vec{p}$ si conserva !!

$m v_i = 2m v_F$

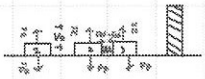
$v_F = \frac{1}{2} v_i$

$E_i = \frac{1}{2} m v_i^2 - \frac{1}{2} 2m \left(\frac{1}{2} v_i\right)^2$

$\frac{1}{2} m v_i^2 - \frac{1}{8} 2m v_i^2$

$\frac{4 m v_i^2 - 2 m v_i^2}{8} = \frac{1}{4} m v_i^2$

Esercizio 1.



1.1 1. URTO TOTALMENTE ANELASTICO (1+2) : E non si conserva.

$\vec{F}_{ext}$ non impulsive $\vec{p}$ si conserva

$m_1 v_0 = (m_1 + m_2) v_F$

$v_F = \frac{m}{2m} v_0 = \frac{v_0}{2}$

2. Molla B?

si conserva 2, 3 si conserva E_{Mec}.

si conserva $\vec{p}$.

sei bella

$U_3 = 0$ perché la molla ISTANTANEAMENTE NON dà impulso.

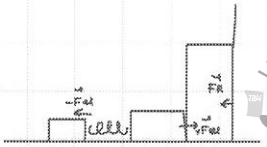
2.) DOPO L'URTO:

ΔE m conserva, ho solo FORZE CONSERVATIVE.

$E_{in} = \frac{1}{2} k x_M^2$

$E_{fin} =$

3)



URTO B+Q

URTO TOTALMENTE ANELASTICO: