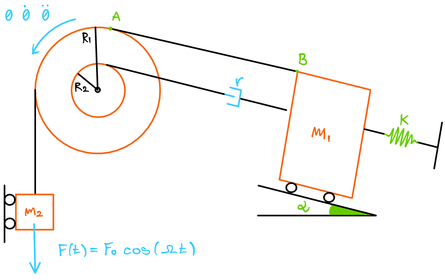
Es 9

Monday, 3 January 2022 17:08

CASINO CASUALMENTE A CASO



TROVA EQUAZIONE DEL MOTO CON LAGRANGE

$$\left[\frac{d}{dt}\left(\frac{\partial E_c}{\partial \dot\theta}\right) - \frac{\partial E_c}{\partial \theta}\right] + \frac{\partial \Delta}{\partial \dot\theta} + \frac{\partial V}{\partial \theta} = \frac{\delta L}{\delta \theta}$$

ENERGIA CINETICA

$$E_c = \frac{m_1 V_1^2}{2} + \frac{m V_2^2}{2} + \frac{\Im \omega^2}{2}$$

$\overline{AB}$ FUNE INESTENSIBILE
TUTTI I PUNTI IN FUNE HANNO LA STESSA VELOCITÀ

$$\overline{V_A} = \overline{V_B}$$

$$V_1(\omega) = V_B = \omega R_2$$

$$V_1(\omega) = V_C = \omega R_2$$

$$E_c = \frac{m_1 \omega^2 R_2^2}{2} + \frac{m_1 \omega^2 R_2^2}{2} + \frac{\Im \omega^2}{2} = \frac{\omega^2}{2}\underbrace{\left(m_1 R_2^2 + m_2 R_2^2 + \Im\right)}_{\Im^*} = \frac{\Im^* \omega^2}{2}$$

$$\frac{\partial E_c}{\partial \theta} = 0$$

$$\frac{\partial E_c}{\partial \omega} = \Im^* \omega = \omega\left(m_1 R_2^2 + m_2 R_2^2 + \Im\right)$$

$$\frac{d}{dt}\left(\frac{\partial E_c}{\partial \omega}\right) = \Im^* \dot\omega = \Im^* \ddot\theta$$

FUNZIONE DISSIPATIVA

$$\Delta = \frac{1}{2} r\, \dot{\Delta l}^2 = \frac{1}{2} r\left(-\omega(R_2 - R_1)\right)^2 = \frac{1}{2}\underbrace{r\left(R_2 - R_1\right)^2}_{r^*} \omega^2 = \frac{1}{2} r^* \omega^2$$

$$\dot{\Delta l} = \underbrace{+\omega R_1}_{\text{RUOTA}} \underbrace{- \omega R_2}_{\text{CORDO R}} = -\omega(R_2 - R_1) \quad \text{SI ACCORCIA}$$

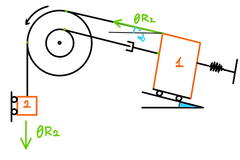
$$\frac{\partial \Delta}{\partial \omega} = r^* \omega$$

FUNZIONE POTENZIALE

$$V = V_E + V_G \qquad \text{ELASTICA + GRAVITAZIONALE}$$

$$\Delta l = \theta R_2 \qquad \text{VINCOLATA A CORPO RIGIDO}$$

$$V_E = \frac{1}{2} K \Delta l^2 = \frac{1}{2}\underbrace{K R_2^2}_{K^*} \theta^2 = \frac{1}{2} K^* \theta^2$$



$$V_G = m_1 g \Delta h_1 + m_2 g \Delta h_2$$

$$\left|\begin{array}{l} \Delta h_1 = \theta R_2 \sin\alpha \\ \Delta h_2 = -\theta R_2 \end{array}\right. \longrightarrow V_G = m_1 g \theta R_2 \sin\alpha - m_2 g \theta R$$

$$V = \frac{K R_2^2 \theta^2}{2} + g\theta R_2^2\left(m_1 \sin\alpha - m_2\right)$$

$$\frac{\partial V}{\partial \theta} = K R_2^2 \theta + \underbrace{g R_2^2\left(m_1 \sin\alpha - m_2\right)}_{\sim} \qquad \begin{array}{l}\text{FORZANTE} \\ \text{GRAVITAZIONALE}\end{array}$$

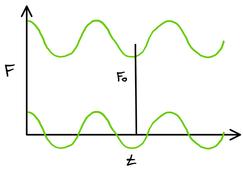
LAVORO VIRTUALE

$$\delta L = F(t) \cdot \delta S = F(t) R_2 \delta\theta \qquad \frac{\delta L}{\delta \theta} = F(t) R_2$$

$$\delta S = R_2 \delta\theta$$

EQUAZIONE DI MOTO

$$\Im^* \ddot\theta + r^* \dot\theta + K\theta = \underbrace{\left(m_2 - m_1 \sin\alpha\right) g R_2}_{\begin{array}{c}\text{PARTICOLARE} \\ \text{COSTANTE}\end{array}} + \underbrace{F_0 R_2 \cos(\Omega t)}_{\begin{array}{c}\text{PARTICOLARE} \\ \text{OSCILLATORIA} \\ \text{ARMONICA}\end{array}}$$



FORZANTE ARMONICA CON COMPONENTE COSTANTE

FORZANTE ARMONICA

OSCILLAZIONE PROPRIA ω DEL SISTEMA ?

$$\omega = \sqrt{\frac{K^*}{\Im^*}} = \sqrt{\frac{K R_2}{m_1 R_2^2 + m_2 R_2^2 + \Im}}$$

COSTANTE DI SMORZAMENTO h

$$h = \frac{r^*}{r_c} = \frac{r^*}{2 m^* \omega} = \frac{r\left(R_2 - R_1\right)^2}{2\omega\left(m_1 R_2^2 + m_2 R_2^2 + \Im\right)}$$

QUANTO VALE θ(t) ? INTEGRALE PARTICOLARE