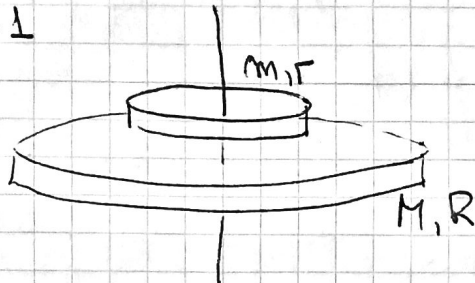


Impulso Angular

$$L = I\omega$$

5.31



$$I_M = \frac{1}{2}MR^2$$

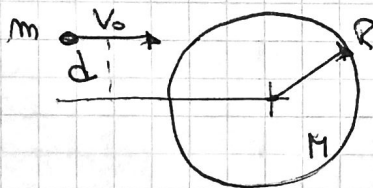
$$I_m = \frac{1}{2}mR^2$$

$$L_0 = I_M \omega_0$$

$$L_f = (I_M + I_m) \omega_f$$

$$\omega_f = \frac{I_M}{I_M + I_m} \omega_0$$

5.36



$$L_i = m v_0 d \quad (\text{no rotar}) (\text{puntual})$$

$$L_f = \left[m R^2 + \frac{1}{2} M R^2 \right] \omega_f$$

$$\omega_f = \frac{m v_0 d}{m R^2 + \frac{1}{2} M R^2}$$

5.33



$$\begin{cases} -f_r = m a_{cm} & (1) \\ -f_r \Delta t = m (v_{cm} - v_0) & (2) \end{cases}$$

$$\Sigma F = \frac{\Delta(mv)}{\Delta t}$$

Sabemos que $\frac{dL}{dt} = M$

$$\Rightarrow \frac{dL}{dt} = M = f_r \cdot R \quad (3)$$

$$dL = f_r \cdot R dt \quad (4)$$

$$I_o (\omega_f - \omega_0) = -m v_{cm} R$$

$$\text{con } v_{cm} = \omega_{cm} R = \omega_f R$$

$$\frac{1}{2} M R^2 (\omega_f - \omega_0) = -m R^2 \omega_f$$

$$\omega_f - \omega_0 = -2 \omega_f \Rightarrow \omega_f = \frac{\omega_0}{3}$$

5.35

$$\begin{aligned} m &= 0.03 \text{ kg} \\ r_o &= 0.2 \text{ m} \\ \omega_o &= 1.75 \text{ s}^{-1} \\ r_f &= 0.1 \text{ m} \end{aligned}$$



No existen fuerzas que realicen momento $\Rightarrow L = \text{cte.}$

$$L_i = m \omega_o r_o^2 = m \omega_o^2 r_o^2$$

$$L_f = m \omega_f r_f^2$$

$$L_i = L_f$$

$$m \omega_o^2 r_o^2 = m \omega_f^2 r_f^2$$

$$\omega_f = \left(\frac{r_o}{r_f} \right)^2 \omega_o$$

$$\Delta E_c = \frac{1}{2} I_f \omega_f^2 - \frac{1}{2} I_o \omega_o^2$$