

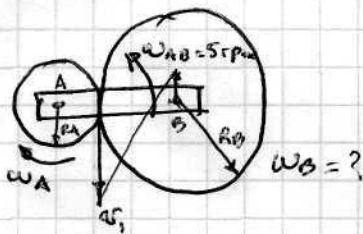
$$\textcircled{1} \quad \text{dem} \begin{cases} x \neq 0 \\ y \neq 0 \\ z = 0 \end{cases}$$

$$[J]_{O(x,y,z)} = \begin{bmatrix} J_{xx} & J_{xy} & 0 \\ J_{yx} & J_{yy} & 0 \\ 0 & 0 & J_{zz} \end{bmatrix}$$

$$\vec{M}_O^F = \frac{d\vec{H}_O}{dt} = \frac{d}{dt} \left\{ \begin{bmatrix} J_{xx} & J_{xy} & 0 \\ J_{yx} & J_{yy} & 0 \\ 0 & 0 & J_{zz} \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ \omega_z \end{bmatrix} \right\} = \frac{d}{dt} (J_{zz} \omega_z) \hat{k}$$

suponiendo que O es un punto fijo:

$$\vec{M}_O^F = J_{zz} \dot{\omega}_z \hat{k}$$

$$\textcircled{2}$$


$$\omega_{AB} = 5 \text{ rpm} \quad R_A = 5 \text{ cm}$$

$$\omega_A = 10 \text{ rpm} \quad R_B = 10 \text{ cm}$$

$$|v_1| = |\omega_A| \cdot R_A$$

$$|v_2| = |\omega_{AB}| \cdot (R_A + R_B)$$

$$\omega_B = \frac{|v_1| + |v_2|}{R_B}$$

$$\omega_B = \frac{|\omega_A| R_A + |\omega_{AB}| \cdot (R_A + R_B)}{R_B}$$

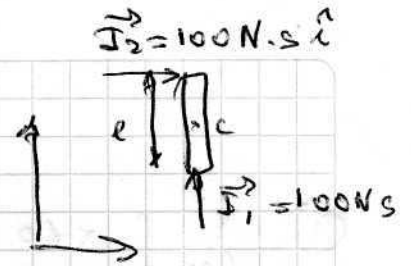
$$\omega_B = \frac{10 \cdot 5 + 5 \cdot 15}{10} = 12,5 \text{ rpm}$$

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$$\vec{I}_1 + \vec{I}_2 = m \cdot \vec{v}_c$$

$$m = 20 \text{ kg}$$

$$l = 1 \text{ m}$$



$$\vec{v}_c = \frac{\vec{I}_1 + \vec{I}_2}{m} = \frac{100 \text{ N.s } \hat{i} + 100 \text{ N.s } \hat{j}}{20 \text{ kg}}$$

$$\boxed{\vec{v}_c = (5 \hat{i} + 5 \hat{j}) \frac{\text{m}}{\text{s}}}$$

$$\vec{J}_c = -|\vec{I}_2| \frac{l}{2} \hat{k} = \Delta H_c = J_c \vec{\omega}$$

$$\vec{\omega} = \frac{-|\vec{I}_2| \frac{l}{2} \hat{k}}{\frac{m l^2}{12}} = \frac{-100 \text{ N.s} \cdot 0,5 \text{ m } \hat{k}}{\frac{20 \text{ kg} \cdot 1 \text{ m}^2}{12}}$$

$$\boxed{\vec{\omega} = -30 \frac{\text{rad}}{\text{s}} \hat{k}}$$