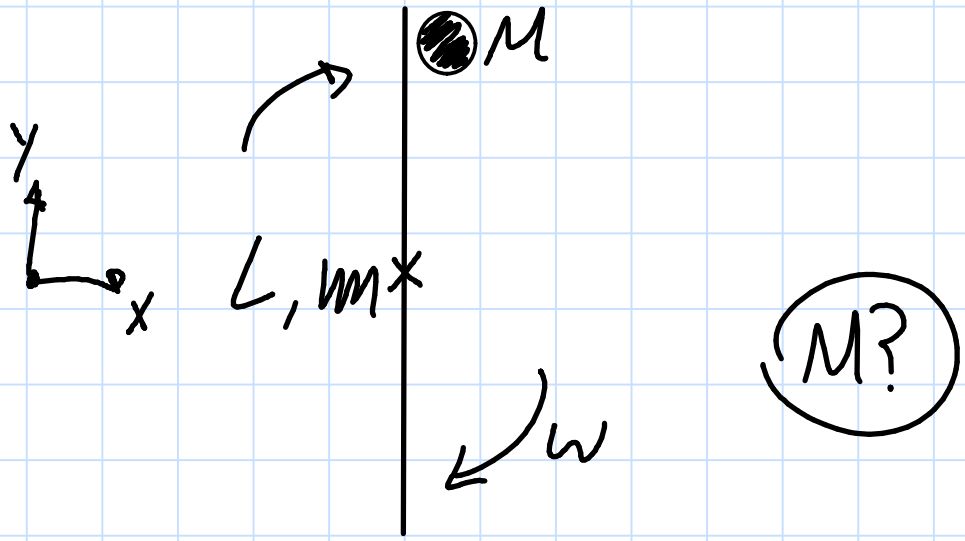

Conservación de la energía:

$$K_i = \frac{1}{2} I w^2 \quad +0,75$$

$$K_f = \frac{1}{2} m v_m^2 + \frac{1}{2} M v_M^2 \quad +0,75$$

$$\Rightarrow I w^2 = m v_m^2 + M v_M^2 \quad (1)$$

Momentum Lineal:

$$P_i = 0 \quad +0,75$$

$$P_f = m v_m + M v_M \quad +0,75 \Rightarrow v_m = -\frac{M}{m} v_M \quad (2)$$

Momentum angular

$$\mathcal{L}_i = I w \quad +0,75$$

$$\mathcal{L}_f = \vec{r}_M \times M \vec{v}_M = \left(x\hat{x} + \frac{L}{2}\hat{y}\right) \times M v_M \hat{x} = -\frac{ML}{2} v_M \hat{z} \quad +0,75$$

$$\Rightarrow I w = -\frac{ML}{2} v_M \quad (3)$$

$$I = \int r^2 dm = \frac{m}{L} \int_{-L/2}^{L/2} r^2 dr = \frac{m r^3}{3L} \Big|_{-L/2}^{L/2}$$

$$I = \frac{m}{3L}\left(\frac{L^3}{8} + \frac{L^3}{8}\right) = \frac{mL^2}{12}$$

Reemplazando en (3)

$$\frac{mL^2}{12}\omega = -\frac{ML}{2}v_M \Rightarrow v_M = -\frac{mL\omega}{6M} \quad +0,5$$

En (2): $$v_m = \frac{M}{m}\frac{L\omega m}{6M} = \frac{L\omega}{6} \quad +0,5$$

En (1): $$\frac{mL^2\omega^2}{12} = m\frac{L^2\omega^2}{36} + \frac{Mm^2L^2\omega^2}{36M^2}$$

$$1 = \frac{1}{3} + \frac{m}{3M}$$

$$3M = M + m$$

$$M = m/2 \quad // \quad +0,5$$