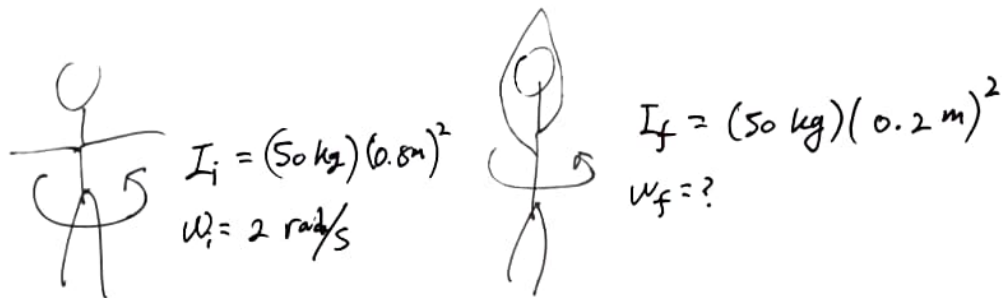


Q1

Conservation of Momentum!!



There is no external force, and by the angular momentum of inertia,
 $\vec{L} = \frac{d\vec{L}}{dt}$

$$\frac{d\vec{L}}{dt} = 0 \quad \Leftrightarrow \quad \vec{L}_f = \vec{L}_i$$

Therefore,

$$\vec{L}_i = I_i \omega_i = (50 \text{ kg})(0.8 \text{ m})^2 \cdot (2 \text{ rad/s})$$

$$\vec{L}_f = I_f \omega_f = (50 \text{ kg})(0.2 \text{ m})^2 \cdot (x \text{ rad/s})$$

Thus,

$$x \text{ rad/s} = \frac{(0.8 \text{ m})^2 (2 \text{ rad/s})}{(0.2 \text{ m})^2} = 32 \text{ rad/s}.$$

$$\therefore \omega_f = 32 \text{ rad/s}$$