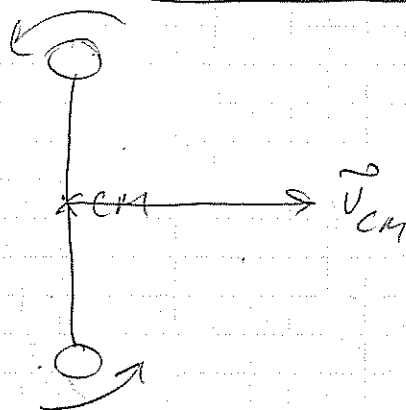


Kinetic Energy of a Rigid Body



Barbell rotates about
CM and CM
moves to the right

$$K = \sum_{i=1}^N K_i \quad \text{for all particles in the rigid body}$$

$$= K_{CM} + K_{rot}$$

$$= \frac{1}{2} M v_{CM}^2 + \frac{L_{rot}^2}{2I_{CM}}$$

$$L_{rot} = I_{CM} \omega_{CM}$$

$$\frac{1}{2} I_{CM} \omega_{CM}^2$$

$$K = \frac{p_{CM}^2}{2M} + \frac{L_{rot}^2}{2I_{CM}}$$

translational
kinetic
energy

rotational
kinetic
energy