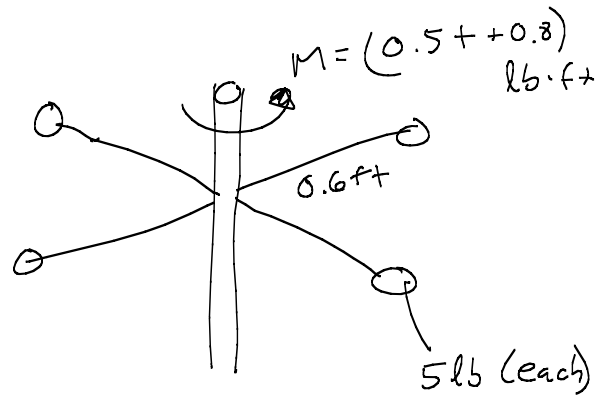


## Principle of Angular Impulse and Momentum

**Problem Statement:** Determine the speed of the spheres after 4 seconds



1.) Calculate the initial angular momentum.

$$dmv_1 = (0.6 \text{ ft}) \left( \frac{5 \text{ lb}}{32.2} \right) (0) \times 4 = 0$$

2.) Calculate the angular impulses.

$$\begin{aligned} \sum \int M dt &= \int_0^4 (0.5t + 0.8) dt = (0.25t^2 + 0.8t) \Big|_0^4 \\ &= 7.2 \text{ kg m}^2/\text{s} \end{aligned}$$

3.) Calculate the final angular momentum.

$$dmv_2 = (0.6 \text{ ft}) \left( \frac{5 \text{ lb}}{32.2} \right) (v_2) \times 4 = 0.373 v_2$$

4.) Apply the Principle of Angular Impulse and Momentum, kinematics, linear impulse and momentum, and any other formulations to solve for the unknowns.

$$0 + 7.2 = 0.373 v_2$$

$$v_2 = 19.32 \text{ ft/s}$$