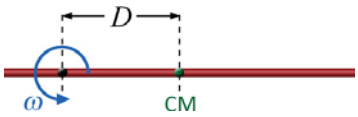
MAIN POINTS

Parallel Axis Theorem

The moment of inertia about a chosen axis is equal to the moment of inertia about a parallel axis passing through the center of mass plus the moment of inertia of the center of mass, treated as a point particle, about the chosen axis.

$$I_{Total} = I_{CM} + MD^2$$



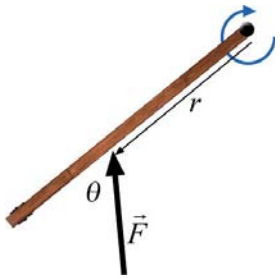
Torque

The concept of torque plays the role for rotational motion that force does for translational motion.

$$\vec{\tau} \equiv \vec{r} \times \vec{F}$$

$$\tau = rF \sin\theta$$

The direction of the torque vector is determined by a right-hand rule: curl fingers from $\vec{r}$ into $\vec{F}$ and then thumb points in direction of torque.



Dynamics Equation for Rotational Motion

The equation that determines the dynamics of rotational motion is derived from Newton's second law.

$$\vec{\tau} = I\vec{\alpha}$$

The net torque about an axis is equal to the product of the moment of inertia about that axis and the angular acceleration.