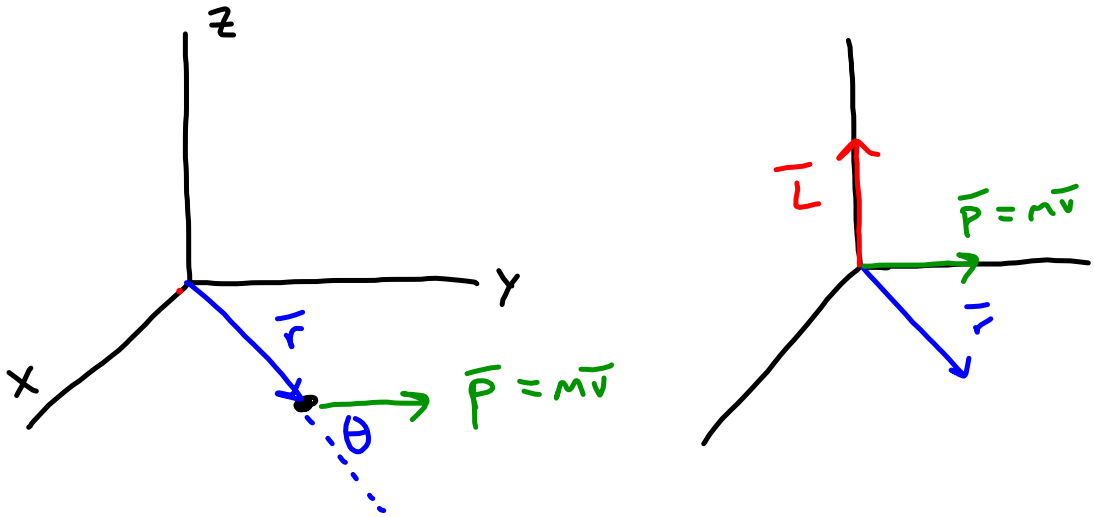
Determine the relationship between moment of inertia and angular velocity.

Whiteboard:
- Description of setup → what you are changing, what is consistent
- Data
- Graph → mathematical relationship and interpretation

Angular Momentum



$$\bar{L} \equiv \bar{r} \times \bar{p} = r m v \sin\theta$$

- Linear

$$\bar{F} = \frac{d\bar{p}}{dt}$$

- Rotational

$$\bar{\tau} = \frac{d\bar{L}}{dt}$$

$$\frac{d\bar{L}}{dt} = \frac{d}{dt}(\bar{r} \times \bar{p})$$

$$= \frac{d\bar{r}}{dt} \times \bar{p} + \bar{r} \times \frac{d\bar{p}}{dt}$$

$\bar{r}$ and $\bar{p}$ are in same direction

$$= \bar{v} \times \bar{p} + \bar{r} \times \bar{F}$$

$\bar{v} \times \bar{p} \to 0$

$\bar{r} \times \bar{F} \to \bar{\tau}$

$$\frac{d\bar{L}}{dt} = \bar{\tau}$$

Angular Momentum of Rigid Body

$$\sum \bar{\tau} = \frac{d\bar{L}}{dt}$$

Rotation of symmetrical object about a fixed axis

$$\bar{L} = I\bar{\omega}$$

$$\bar{\omega} = \bar{L}\left(\frac{1}{I}\right)$$

↳ slope