

Rotational Motion

$$\tau_{\text{net}} = I\alpha \quad \tau = r F \sin\theta \quad \tau = r F$$

Linear to Rotational Conversions

$$x = r\theta \quad v = r\omega \quad a = r\alpha$$

Rotational Kinematics

$$\Delta\theta = \omega_i t + \frac{1}{2}\alpha t^2 \quad \omega = \omega_i + \alpha t \quad \omega^2 = \omega_i^2 + 2\alpha\Delta\theta$$

Rotational Momentum

$$L = I\omega \quad K = \frac{1}{2}I\omega^2 \quad \Delta L = \tau\Delta t$$

Momentum (Linear)

When
Momentum is
Conserved:

$$\sum p_i = \sum p_f$$

$$p = mv \quad \Delta p = F\Delta t \text{ or } J = F\Delta t \quad p_f = p_i + J$$

Types of Collisions

Elastic Collision KE conserved & momentum conserved Bounce perfectly off each other

Inelastic Collision KE lost & momentum conserved Travel in same direction at different speeds

Perfectly Inelastic Collision Greatest KE lost & momentum conserved Objects coupled and travel in same direction

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By **qwet11**

[cheatography.com/qwet11/](https://www.cheatography.com/qwet11/)

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