



Kinematics:

- **position:** $\vec{r}(t) = \int \vec{v}(t) dt$
- **velocity:** $\vec{v}(t) = \frac{d\vec{r}}{dt} = \int \vec{a}(t) dt$
- **acceleration:** $\vec{a}(t) = \frac{d\vec{v}}{dt} = \frac{d^2\vec{r}}{dt^2}$

Dynamics: cause and effect: $\vec{F} = m\vec{a}$

Modes of motion: translation, rotation

Conservation laws: energy, momentum, angular momentum

Effective forces: elastic, contact, friction, ...

Fundamental forces: gravitational, electric, magnetic, ...