Physics Booklet

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Contents

Classical Mechanics

1.1 Kinematics

1.1.1 Basic concepts

- Velocity

$$\overrightarrow{v}(t) = \frac{d\overrightarrow{r}}{dt}$$

  $\overrightarrow{r}(t)$: position

- Speed

$$v = |\overrightarrow{v}| = \left|\frac{d\overrightarrow{r}}{dt}\right|$$

- Acceleration

$$\overrightarrow{a}(t) = \frac{d\overrightarrow{v}}{dt}$$

- Other rates
  - Jerk

$$\overrightarrow{j}(t) = \frac{d\overrightarrow{a}}{dt}$$

  - Snap

$$\overrightarrow{s}(t) = \frac{d\overrightarrow{j}}{dt}$$

  - Crackle

$$\overrightarrow{c}(t) = \frac{d\overrightarrow{s}}{dt}$$

  - Pop

$$\overrightarrow{p}(t) = \frac{d\overrightarrow{c}}{dt}$$

1.2 Forces

1.3 Energy

1.4 Momentum

1.5 Angular momentum

1.6 Lagrangian method

Relativistic Mechanics

Electromagnetism

Thermodynamics

Statistical mechanics

Quantum mechanics