AI Response:

Kinematics is a branch of classical mechanics that describes the motion of objec

Key Concepts in Kinematics

1. **Displacement**: The change in position of an object. It is a vector quantity, w

2. **Distance**: The total path length traveled by an object, regardless of directio

3. **Velocity**: The rate of change of displacement with respect to time. Like disp
   $$
   \text{Velocity} = \frac{\text{Displacement}}{\text{Time}}
   $$
   Average velocity considers the total displacement over the total time, while inst

4. **Speed**: The rate of motion irrespective of direction. It is a scalar quantity ca
   $$
   \text{Speed} = \frac{\text{Distance}}{\text{Time}}
   $$

5. **Acceleration**: The rate of change of velocity with respect to time. It is also a
   $$
   \text{Acceleration} = \frac{\text{Change in Velocity}}{\text{Time Interval}}
   $$
   Like velocity, acceleration can be classified as average or instantaneous.

Kinematic Equations

For objects moving with constant acceleration, the following equations (often refe

1. $v = u + at$
2. $s = ut + \frac{1}{2}at^2$
3. $v^2 = u^2 + 2as$
4. $s = \frac{(u + v)}{2}t$

Where:
- u = initial velocity
- v = final velocity
- a = acceleration
- t = time
- s = displacement

Types of Motion

1. **Rectilinear Motion**: Movement in a straight line