AI Response:

Kinematics is a branch of mechanics that focuses on the motion of objects witho

Key Concepts

1. **Displacement**: A vector quantity that represents the change in position of a

2. **Distance**: A scalar quantity that describes the total length of the path travel

3. **Velocity**: A vector quantity that refers to the rate of change of displacemen
   $$
   v = \frac{\Delta x}{\Delta t}
   $$
   where Δx is the change in position and Δt is the change in ti

4. **Speed**: A scalar quantity that represents how fast an object is moving, calc
   $$
   \text{Speed} = \frac{\text{Distance}}{\Delta t}
   $$

5. **Acceleration**: A vector quantity that represents the rate of change of velocit
   $$
   a = \frac{\Delta v}{\Delta t}
   $$
   where Δv is the change in velocity.

Equations of Motion

For objects moving with constant acceleration, the kinematic equations can be u

1. $v = u + at$
   (Final velocity = Initial velocity + Acceleration × Time)

2. $s = ut + \frac{1}{2} a t^2$
   (Displacement = Initial velocity × Time + 0.5 × Acceleration × Time²)

3. $v^2 = u^2 + 2as$
   (Final velocity squared = Initial velocity squared + 2 × Acceleration × Displacem

4. $s = \frac{(u + v)}{2} \times t$
   (Displacement = Average of initial and final velocity × Time)

Types of Motion

1. **Uniform Motion**: Motion at a constant speed in a straight line