

# Physics

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# Newtonian Physics

- Successful prediction of movement requires the level understanding used by physics engines
- All entities have certain physical properties (velocity, acceleration, center of mass)
- Velocity is derivative of the position  
 $v = dx/dt$
- Acceleration is derivative of velocity  
 $A = dv/dt$

# Numeric Integration

- One big problem in physics implementations is keeping track of position changes over time
- Position can be defined as the integral (or accumulation) of the velocity
- Numeric integrators are algorithms that compute values that change over time
- Integrators for position and velocity as time functions might be denoted as  $x(t)$  and  $v(t)$