

Basic Game Physics

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Why Physics?

- Some games don't need any physics
- Games based on the real world should look realistic, meaning realistic action and reaction
 - More complex games need more physics:
 - sliding through a turn in a racecar, sports games, flight simulation, etc.
 - Running and jumping off the edge of a cliff
- Two types of physics:
 - Elastic, rigid-body physics, $F = ma$, e.g., pong
 - Non-elastic, physics with deformation: clothes, pony tails, a whip, chain, hair, volcanoes, liquid, boomerang
- Elastic physics is easier to get right

Game Physics

- Approximate real-world physics
- We don't want just the equations
- We want *efficient* ways to compute physical values
 - Assume fixed discrete simulation – constant time step
 - Must account for actual time passed for variable simulation
- Assumptions:
 - 2D physics, usually easy to generalize to 3D (add z)
 - Rigid bodies (no deformation)
 - Will just worry about center of mass
 - Not accurate for all physical effects
 - Constant time step