Intro to building a physically based simulator

These course notes are an excellent introduction to writing a physically based simulator:


You can find a description of how to handle rigid body contact using impulses here:


You can find a clear writeup about the spring mass system's behavior and a reminder for how to solve those differential equations here:


We talked about this paper, which talks about particle simulation with constraints and Verlet integration in the context of simulating rag doll characters for the game Hitman.


This paper has a good practical discussion about different integrators and discusses the design decisions behind Maya nCloth, nParticle, etc.

Some Simulation References

Fortunately, there are many good simulation engines out there. You do not have to write your own! Here are some references to get you started.

Open Dynamics Engine  http://www.ode.org/

Bullet Physics Library  http://bulletphysics.org/wordpress/

Also check out this SIGGRAPH 2011 course: http://bulletphysics.org/siggraph2011/

Karen Liu’s RTQL8  http://www.cc.gatech.edu/~karenliu/RTQL8.html

Karen Liu’s DART  http://dartsim.github.io/

Emanuel Todorov’s MuJoCo has apparently not yet been released? http://www.mujoco.org/

Box2D  http://box2d.org/

Gazebo  http://gazebosim.org/