Elastoplasticity Simulation with the Material Point Method

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Kemeny 007, 3:30PM
3 PM in Kemeny 300

Abstract

Hyperelastic constitutive models describe a wide range of materials. Examples include biomechanical soft tissues like muscle, tendon, skin etc. Elastoplastic materials consisting of a hyperelastic constitutive model combined with a notion of stress constraint (or feasible stress region) describe an even wider range of materials. A very interesting class of these models arise from frictional contact considerations. I will discuss some recent results and examples in computer graphics and virtual surgery applications. Examples include simulation of granular materials like snow in Walt Disney’s “Frozen” as well as frictional contact between thin elastic membranes and shells for virtual clothing simulation. I will also discuss practical simulation of these materials with some recent algorithmic modifications to the Particle-In-Cell (PIC) technique, the Material Point Method (MPM).

This talk should be accessible to...