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*Sensitivity-Based Optimization Applied to Equations Modeling Film Casting.*

There are many techniques to solve optimization problems. Sensitivity-based optimization methods determine the effect a change in the control variables has on the state variables. We may apply sensitivity-based optimization to real-world physical processes modeled by partial differential equations. In this setting, we would like to optimize an aspect of the process subject to the modeling equations.

The abstract setting for sensitivity-based optimization will be described, and its advantages and disadvantages will be discussed. We will then consider a system of nonlinear differential equations that model film casting. The sensitivity system for these equations will be derived, and a solution to a physical problem will be presented. (Received September 22, 2009)