Sven-Joachim Kimmerle

Optimal control of macroscopic models for phase transitions

On a macroscopic level Lifshitz-Slyozov-Wagner (LSW) models prescribe the size evolution of precipitated droplets for two-phase systems, yielding a hyperbolic differential equation with a non-local coupling to an algebraic equation. For industrial applications it is interesting to control the resulting distribution of droplet volume. While there are optimal control results for phase field models (e.g. Cahn-Hilliard or Allen-Cahn) as well as for nonlinear hyperbolic conservation laws, control problems for LSW equations and its discretized version, so-called mean field models, have not been considered so far. We discuss analytical issues of this important class of control problems, involving measure-valued solutions or switching conditions, and present numerical results.