Nonsmooth Schur–Newton methods for multicomponent Cahn–Hilliard equations

FS: Algorithms and adaptivity for PDE-constrained optimization

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Discretization of multicomponent Cahn–Hilliard systems leads to large scale nonsmooth nonlinear saddle point problems with local simplex constraints. Those problems can also be viewed as control problems for an elliptic pde with a highly nonlinear energy functional. Based on a unified discretization for logarithmic and obstacle type potentials we apply a nonsmooth Schur-Newton method for the efficient numerical solution. The method is globally convergent, mesh independent, and robust with respect to the temperature and the number of components.

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