

SIMULATION AND CONTROL OF MULTIPHASE FLOWS GOVERNED BY THE CAHN-HILLIARD NAVIER-STOKES SYSTEM (CHNSS)

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Abstract

In the first part of the talk we consider multiphase flow governed by the CHNSS in the phase field approximation with the double obstacle potential, and apply a semi-implicit scheme to its time discretization. We relax the variational inequalities appearing in every time step by a penalization approach and develop reliable and effective residual based a posteriori error estimators for the resulting PDE system along the lines of [1]. In the second part of the talk we develop a model predictive feedback control strategy. Several numerical experiments show the performance of our approach. The work presented in the first part extends the investigations of [1] on adaptivity for the Cahn Hilliard system to the CHNSS.

References

- [1] HINTERMÜLLER, M., HINZE, M., KAHLE, C.: *An adaptive finite element Moreau-Yosida-based solver for a non-smooth Cahn-Hilliard problem*. Optim. Meth. Software 26:777-811 (2011)