A PHASE-FIELD MODEL AND ITS NUMERICAL APPROXIMATION FOR TWO-PHASE INCOMPRESSIBLE FLOWS WITH DIFFERENT DENSITIES AND VISCOSITIES

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Abstract

Modeling and numerical approximation of two-phase incompressible flows with different densities and viscosities are considered. A physically consistent phase-field model that admits an energy law is proposed, and several energy stable, efficient, and accurate time discretization schemes for the coupled nonlinear phase-field model are constructed and analyzed. Adequate numerical experiments are carried out to validate the correctness of these schemes and their accuracy for problems with large density and viscosity ratios.

Keywords

Author Keywords: phase-field, two-phase flow; Navier-Stokes; variable density; projection methods; stability

KeyWords Plus: NAVIER-STOKES EQUATIONS; VARIABLE-DENSITY; PROJECTION METHODS; FLUIDS; 2ND-ORDER

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