Energy Stable Schemes for Phase Field Model with Moving Contact Lines

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We present two efficient energy stable schemes to solve the phase field model with moving contact line. The model is a coupled system that consists of Navier-Stokes equations and Cahn-Hilliard equation in the conserved form with generalized Navier boundary conditions. In both schemes, the projection method is used to deal with the incompressible Navier-Stokes equations and stabilization approach is used for the non-convex Ginzburg-Landau bulk potential. By some subtle explicit-implicit treatments, we obtain a linear, coupled energy stable scheme for systems with general boundary conditions and a linear, decoupled energy stable scheme for systems with static contact line condition. A Numerical simulations show that the proposed schemes are very efficient and accurate.