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Jie Shen* (shen7@purdue.edu), Department of Mathematics, Purdue University, West Lafayette, IN 47906. *Decoupled energy stable schemes for phase-field models of two-phase complex fluids.*

We consider in this paper numerical approximations of phase-field models for twophase complex fluids. We first reformulate the phase-field models derived from an energetic variational formulation into a form which is suitable for numerical approximation and establish their energy laws. Then, we construct two classes, stabilized and convex-splitting, of decoupled time discretization schemes for the coupled nonlinear systems. These schemes are unconditionally energy stable and lead to decoupled elliptic equations to solve at each time step. Furthermore, these elliptic equations are linear for the stabilized version. Stability analysis and ample numerical simulations are presented. (Received August 05, 2015)