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Title: EXISTENCE OF SOLUTION FOR A SOLIDIFICATION MODEL WITH CONVECTION

Abstract: In this work, we introduce a PDE problem modeling a solidification/melting process in bounded 3D domains, coupling a phase-field equation and a free-boundary Navier-Stokes-Boussinesq system, where the latent heat effect is considered via a modification of the Caginalp model. Moreover, the convection in the non-solid regions is treated via a phase-dependent viscosity of the material that degenerates in the solid phase, letting only rigid motions in this phase. Then, we prove existence of global in time weak solutions for a regularized model, by means of the convergence of non-degenerate problems furnished truncating the viscosity.