Stability of equilibria for incompressible two-phase flows with phase transitions

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Abstract

A basic model for incompressible two-phase flows with phase transitions consistent with thermodynamics in a bounded domain in the case of constant but non-equal densities of the phases is considered. We briefly discuss the well-posedness of the model in an L_p-setting which is based on *maximal regularity*. The main part of the talk is devoted to the stability of the equilibria. The negative total entropy of the problem serves as a Ljapunov functional and hence we know that the equilibria without boundary contact are zero velocity, constant temperature, constant pressure in each phase, and a subdomain, which forms one phase in the bounded domain, consists of a finite number of nonintersecting balls of equal size. We prove that an equilibrium is stable if and only if the phases are connected, otherwise it is unstable. This is a joint work with J. Prüss (Halle) and M. Wilke (Halle).