

Abstract Submitted
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Influence of adsorption kinetics on the Marangoni convection in a binary liquid layer with a soluble surfactant¹ ALEXANDER A. NEPOMNYASHCHY, Technion – Israel Institute of Technology, Haifa, Israel, SERGEY SHKLYAEV, Institute of Continuous Media Mechanics, Perm, Russia — We consider dynamics of a heated binary liquid in a horizontal layer. The solute is a soluble surfactant, which forms a surface phase and a bulk phase. Both the Soret effect and the adsorption kinetics are taken into account. Within the linear stability problem we demonstrate that the adsorption kinetics leads to a significant stabilization of the quiescent state with respect to oscillatory and monotonic longwave modes and a short-wave oscillatory mode. For the latter mode the stabilization is especially strong. Weakly-nonlinear analysis is carried out for the longwave modes, it results in an ill-posed set of amplitude equations. A subcritical bifurcation for both longwave modes is predicted, no nonlinear saturation takes place in the supercritical region. In a number of limiting cases more intricate amplitude equations are obtained; for the fast adsorption kinetics a transition between supercritical and subcritical bifurcations is found.

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