

Abstract Submitted
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Weakly nonlinear dynamics of the longwave Marangoni instability in a binary-mixture layer in the presence of the Soret effect.¹ ALEXANDER ORON, Mechanical Engineering, ALLA PODOLNY, Mathematics, ALEXANDER A. NEPOMNYASHCHY, Mathematics, TECHNION-ISRAEL INSTITUTE OF TECHNOLOGY TEAM — We consider a system consisting of a layer of an incompressible binary liquid with a deformable free surface. We investigate the long-wave Marangoni instability in the case of small Lewis and Galileo numbers for finite capillary and Biot numbers in the case of a specified heat flux at the solid substrate. The Soret effect is taken into account. Both long-wave monotonic and oscillatory modes of instability are found in various parameter domains of the Biot and Soret numbers. We have derived a set of strongly nonlinear evolution equations describing the spatio-temporal dynamics of the layer in three dimensions in the case of the oscillatory instability. The weakly nonlinear analysis based on these equations demonstrates the presence of several kinds of stable supercritical standing and travelling waves.

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