Long-wave Marangoni convection in a heated liquid layer with insoluble surfactant[1] MATVEY MOROZOV, ALEX ORON, ALEXANDER NEPOMNYASHCHY, Technion - Israel Institute of Technology — Recently, long-wave Marangoni convection in a heated binary-liquid layer was considered by Podolny *et al.* (Phys. Fluids **18**, 054104, 2006) revealing rich dynamics stemming from oscillatory instability. These results were obtained in the absence of surfactants. In the present work we investigate an opposite limit: a liquid layer with insoluble surfactant. We consider a liquid layer lying on a solid horizontal substrate with insoluble surfactant adsorbed at the deformable free surface. Convection is triggered by a given transverse temperature gradient. Long-wave linear stability analysis of the quiescent state of the layer reveals a competition between monotonic and oscillatory modes of instability. We derive nonlinear evolution equations governing the large-scale dynamics of the layer. Linear stability analysis of these equations indicates their applicability only in the case of oscillatory instability. We then carry out weakly nonlinear analysis in the vicinity of the oscillatory-instability threshold for the case of a 2D layer, and study corresponding pattern selection. Finally, we compare the analytical results with the numerical solutions of our nonlinear evolution equations.

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