Vibrational instabilities of a nonisothermal liquid layer with insoluble surfactant ALEXANDER MIKISHEV, Sam Houston State Univ, ALEXANDER NEPOMNYASHCHY, Technion — We consider an infinite horizontal layer of an incompressible liquid, the deformable upper free surface is covered by insoluble surfactant. The layer is subjected to vertical harmonic oscillations with fixed amplitude and frequency, as well as to a transverse gradient of temperature. We suppose that the surface tension of upper boundary linearly depends on temperature and surfactant concentration. Two types of waves on the surface are possible. The first one is capillary-gravity waves (transverse waves) excited by the usual Faraday instability mechanism, under the influence of the surfactant elasticity. The second type of waves is Marangoni waves (longitudinal waves) related to compressions dilations of the surface. In this work we study the excitation of Marangoni waves by vibration and determine the existence conditions for each type of waves. The results are connected with our previous research on parametric excitation of Marangoni instability when the gradient of temperature is harmonically changed. The instability thresholds are calculated numerically using the Floquet method for disturbances with arbitrary wave numbers.

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