Longwave Marangoni instability in a binary-liquid layer with deformable interface in the presence of Soret effect. The case of a finite Biot number\textsuperscript{1} A. ORON, A. PODOLNY, A. A. NEPOMNYASHCHY, Technion- Israel Institute of Technology, Haifa, ISRAEL — We investigate the long-wave Marangoni instability in a binary-liquid layer with a deformable interface in the limit of a finite Biot number $B$ and a specified heat flux at the solid substrate and in the presence of the Soret effect. In the fundamental case (a) of both finite Galileo and Lewis numbers, $G$ and $L$, respectively, and a large inverse capillary number $S$, both monotonic and oscillatory instabilities are present. The monotonic instability takes place with the critical Marangoni number $M_{\text{mon}} = 48L\chi^{-1}$, where $\chi$ is the Soret (separation) number when $-1 < \chi < 0$. When $(1 + \chi)/\chi > 0$, this instability emerges if $L < L_+ = \chi B (1 + \chi)^{-1}/15$. The oscillatory instability takes place with the critical Marangoni number depending on the scaled wavenumber of the disturbance $K$, given by $M_{\text{osc}} = (G + 3L + K^2 S)\chi^{-1}$, for disturbances with a sufficiently long wavelength when $G < 45L$. Both types of instability emerge also when (b) $G, L, S$ are all finite; and (c) both $G$ and $L$ are small and $S$ is finite. A set of nonlinear evolution equations has been derived in both cases (a) and (c).

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