

Nonlinear Long Waves on the Interface of a Two-Layered Horizontal Flow of Viscous Liquids

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This paper deals with the theoretical study of plane waves with small but finite amplitude in the two-layer system bounded by the horizontal lid and bottom. It is supposed that characteristic lengths of perturbations are sufficiently larger, its amplitudes are much smaller, and non-stationary boundary layers are much less than depths of liquids. It is shown that dissipation affects distinctly on a vertical motion at relatively high velocities of the steady unperturbed flow. The evolution equation for the interface disturbances, which takes into account long-wave contributions of the layers inertia, weakly non-linearity of waves and non-stationary shear stresses at all boundaries of the system is obtained. On neglect of dissipation for the perturbation current steady-state solutions of conical and solitary waves type are determined. It is found that amount and direction of a flow may change not only lengths of disturbances but its polarity too.

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