



Steady internal waves in an exponentially stratified two-layer fluid

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The problem on internal waves in a weakly stratified two-layered fluid is studied analytically. We suppose that the fluid possess exponential stratification in both the layers, and the fluid density has discontinuity jump at the interface. By that, we take into account the influence of weak continuous stratification outside of sharp pycnocline. The model equation of strongly nonlinear interfacial waves propagating along the pycnocline is considered. This equation extends approximate models [1-3] suggested for a two-layer fluid with one homogeneous layer. The derivation method uses asymptotic analysis of fully nonlinear Euler equations. The perturbation scheme involves the long wave procedure with a pair of the Boussinesq parameters. First of these parameters characterizes small density slope outside of pycnocline and the second one defines small density jump at the interface. Parametric range of solitary wave solutions is characterized, including extreme regimes such as plateau-shape solitary waves. This work was supported by RFBR (grant No 15-01-03942).

References

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