

Generation Transcritical Flow Influenced by Dissipation over a Hole

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Abstract : The transcritical flow of a stratified fluid over an obstacle for negative forcing amplitude (hole) that generation upstream and downstream, connected by an unsteady solution, is examined. In the weakly nonlinear, weakly dispersive regime, the problem is formulated in the forced Korteweg-de Vries-Burgers framework. This is done by including the influence of the viscosity of the fluid beyond the Korteweg-de Vries approximation. The results show that the influence of viscosity is crucial in determining various wave properties, including the amplitudes of solitary waves in the upstream and downstream directions, as well as the widths of the bores. We focused here on weak damping, and the results are presented for transcritical, supercritical, and subcritical flows. In general, the outcomes are not qualitatively similar to those from the forced Korteweg-de-Vries equation when the value of the viscous is small, interesting differences emerge as the magnitude of the value of viscous increases.

Keywords : Korteweg-de Vries-Burgers equation, soliton, transcritical flow, viscous flow

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