

Nonlinear Partial Differential Equations

Boundary value problems and equations arising in fluid mechanics

Three-Dimensional Solitary Water Waves with Weak Surface Tension

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I will present a variational existence theory for three-dimensional fully localised solitary water waves with weak surface tension. The water is modelled as a perfect fluid of finite depth undergoing irrotational flow; a fully localised solitary wave is a travelling wave which decays to the undisturbed state of the water in every horizontal direction. These waves are constructed as critical points of the functional $\mathcal{E} - c\mathcal{I}$, where \mathcal{E} and \mathcal{I} are the energy and momentum of the wave and c is its speed. A key ingredient is a variational reduction method which reduces the problem to a perturbation of the Davey-Stewartson equation.

This is joint work with B. Buffoni (Lausanne) and E. Wahlén (Lund).