Numerical Computation of Stationary Solitary Waves to 2D Boussinesq Equation

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The aim of this work is to evaluate stationary moving solitary wave solutions to the 2D Boussinesq equation. To solve the resulting nonlinear fourth order elliptic problem we use a combination of high order finite difference schemes, an iterative procedure and new asymptotic boundary conditions.

Numerical tests with several finite difference schemes (of 2nd, 4th, and 6th order of approximation), a variety of parameters of the problem and two initial approximations for the iterative process (the best fit formulas given in in the paper "C. I. Christov, J. Choudhury, Mech. Res. Commun., 38 (2011) 274 – 281" and the solution to the ground state equation) show that the numerical solutions converge with a high accuracy to the one and the same solution of the initial problem.