

Finite Difference Schemes for Sixth Order Boussinesq Equation

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We study the general Boussinesq equation

$$u_{tt} - u_{xx} - \beta_1 u_{ttxx} + \beta_2 u_{xxxx} - \beta_3 u_{xxxxxx} + f(u)_{xx} = 0$$

with sixth order dispersion terms.

For the numerical solution of this problem a family of finite difference schemes is constructed. The preservation of the discrete energy and a second order of convergence of the discrete solution to the exact one in the $W_{2,h}^1$ mesh norm are proved.

The schemes have been numerically tested in the cases of quadratic and cubic function f . The numerical experiments show good agreement with the theoretical results.

This research is partially supported by the Bulgarian Science Fund under grant DFNI I-02/9.