FOURTH ORDER FINITE DIFFERENCE SCHEME FOR THE GOOD BOUSSINESQ EQUATION

ABSTRACT

In this paper the nonlinear Good Boussinesq equation is transformed into a system of first order differential equations. The analytical solution of the nonlinear Good Boussinesq equation is generally difficult to be determined so that it needs a numerical approximation. Numerical scheme wich is used in this paper is a finite difference scheme obtained from Padé approximation. It is shown that numerical scheme is fourth order accurate in space, second order accurate in time and is unconditionally stable. Linearization technique is used to ease the numerical simulation of nonlinear Good Boussinesq equations system scheme. Numerical simulation results show that the interaction of the two waves are sensitive toward the value of the amplitude where the blow up solution occurs if the initial amplitude is relatively large.

Keywords: nonlinear Good Boussinesq equation, fourth order finite difference scheme, Padé approximation, blow up