The Solution of the Regularized Long Wave Equation Using the Fourier Leap-Frog Method

Hany N. Hassan[a] and Hassan K. Saleh[b]

[a] Department of Basic Science, High Institute of Technology, Benha University, Benha 13512, Egypt
[b] Department of Engineering Mathematics and Physics, Faculty of Engineering, Cairo University, Giza, Egypt

Reprint requests to H. N. H.; E-mail: h_nasr77@yahoo.com

An efficient numerical method is developed for solving nonlinear wave equations by studying the propagation and stability properties of solitary waves (solitons) of the regularized long wave (RLW) equation in one space dimension using a combination of leap frog for time dependence and a pseudospectral (Fourier transform) treatment of the space dependence. Our schemes follow very accurately these solutions, which are given by simple closed formulas. Studying the interaction of two such solitons and three solitary waves interaction for the RLW equation. Our implementation employs the fast Fourier transform (FFT) algorithm.