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Solitary wave solutions for a coupled pair of mKdV equations

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Abstract

Propagation of weakly nonlinear long waves is studied within the framework of a system of two coupled modified Korteweg-de Vries equations. We investigate analytically and numerically the various families of soliton states for the considered model. By scaling the functions and variables we find that the resulting coupled pair of equations has only one combined parameter. This parameter depends on the wave speed and the coupling coefficient. Explicit analytical expressions for both of the symmetric and antisymmetric states are determined. Numerical method is derived to solve the proposed system, many numerical tests have been conducted to study the behavior of the solution, and the existence of the asymmetric soliton states is displayed numerically. © 2009.

Author Keywords

Finite difference method; Modified Korteweg-de Vries equation; Soliton solution

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