

Localized Excitations of (2+1)-Dimensional Korteweg-de Vries System Derived from a Periodic Wave Solution

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(Received: 2006-3-29; Revised: 2006-6-29)

Abstract: With the aid of an improved projective approach and a linear variable separation method, new types of variable separation solutions (including solitary wave solutions, periodic wave solutions, and rational function solutions) with arbitrary functions for (2+1)-dimensional Korteweg-de Vries system are derived. Usually, in terms of solitary wave solutions and rational function solutions, one can find some important localized excitations. However, based on the derived periodic wave solution in this paper, we find that some novel and significant localized coherent excitations such as dromions, peakons, stochastic fractal patterns, regular fractal patterns, chaotic line soliton patterns as well as chaotic patterns exist in the KdV system as considering appropriate boundary conditions and/or initial qualifications.

PACS: 03.65.Ge, 05.45.Yv

Key words: improved projective approach, KdV system, chaos, soliton, fractal

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