1-SOLITON SOLUTION OF THE THREE COMPONENT SYSTEM OF WU-ZHANG EQUATIONS

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Abstract
In this paper, the 1-soliton solution is obtained for the three-component Wu-Zhang equation. The soliton components comprises both topological as well as non-topological soliton solutions. The ansatz method is employed to carry out the integration of this coupled system of nonlinear evolution equations.

Keywords: Solitons, Integrability, Ansatz method.

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1. Introduction

In the theoretical investigation of the dynamics of nonlinear waves, coupled nonlinear partial differential equations (NLPDEs) are of great importance, due to their very wide applications in many fields of physics. As a matter of fact, coupled NLPDEs are used to model motions of waves in a great array of contexts, including plasma physics, fluid mechanics, optical fibers, hydrodynamics, quantum mechanics and many other nonlinear dispersive systems.

To understand the complex dynamics underlying coupled NLPDEs, it is instructive to investigate the propagation behaviour of traveling waves and their stability in the presence of perturbations. Traveling waves appear in many physical structures in solitary wave theory such as solitons, kinks, peakons, and cuspons [12].

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