

Structures and Interactions of Soliton in (2+1)-Dimensional Generalized Nizhnik-Novikov-Veselov Equation

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Abstract: A variable separation approach is used to obtain exact solutions of the (2+1)-dimensional generalized Nizhnik-Novikov-Veselov equation. Two of these exact solutions are analyzed to study the interaction between a line soliton and a y-periodic soliton (i.e. the array of the localized structure in the y direction, which propagates in the x direction) and between two dromions. The interactions between a line soliton and a y-periodic soliton are classified into several types according to the phase shifts due to collision. There are two types of singular interactions. One is the resonant interaction that generates one line soliton while the other is the extremely repulsive or long-range interaction where two solitons interchange each other infinitely apart. Some new phenomena of interaction between two dromions are also reported in this paper, and detailed behaviors of interactions are illustrated both analytically and graphically.

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Key words: interaction between two solitons, variable separation approach, GNNV equation

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