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New solitary solutions of the Gardner equation and Whitham-Broer-Kaup equations by the modified simplest equation method

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.Abstract

In this paper, the modified simplest equation method (SEM) is employed to handle the Gardner equation and Whitham-Broer-Kaup (WBK) equations, respectively. Five new solitary solutions are accordingly obtained. The paper proceeds step-by-step with increasing detail about derivation process, first illustrating the algorithm of the modified SEM, which the simplest equation and its exact solution are not pre-defined. Then, new solutions are used to illustrate the connection between the Gardner equation and WBK equations. In addition, new solutions are reconstructed as solutions for the VBEs, ALWEs, the dispersive long wave equations, and the modified KdV equation.

Keywords: the simplest equation method; the Gardner equation; Whitham-Broer-Kaup equations; solitary; the modified KdV equation.

1. Introduction

In recent years the nonlinear evolution equations (NLEEs) have been used to model

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