

Symmetry Reductions, Integrability and Solitary Wave Solutions to High-Order Modified Boussinesq Equations with Damping Term

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Abstract: Both the direct method due to Clarkson and Kruskal and the improved direct method due to Lou are extended to reduce the high-order modified Boussinesq equation with the damping term (HMBEDT) arising in the general Fermi-Pasta-Ulam model. As a result, several types of similarity reductions are obtained. It is easy to show that the nonlinear wave equation is not integrable under the sense of Ablowitz's conjecture from the reduction results obtained. In addition, kink-shaped solitary wave solutions, which are of important physical significance, are found for HMBEDT based on the obtained reduction equation.

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Key words: modified Boussinesq equation with the damping term, nonlinear evolution equation, symmetry reduction, integrability, solitary wave solution

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