

量子物理

带强迫项的KdV方程的非线性自伴随性和守恒律

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摘要: 应用非线性自伴随性的概念和伊布拉基莫夫的一般守恒律定理, 研究了带强迫的KdV方程的非线性自伴随性和守恒律。首先讨论了自伴随性, 结果表明这个方程具有非线性自伴随性, 同时得到了这个方程的形式拉格朗日量。在对这个方程进行李对称分析之后, 根据李对称的不同得到了这个方程的一些非平凡守恒律。

关键词: 非线性方程 带强迫项的KdV方程 守恒律 李对称 形式拉格朗日量

Nonlinear self-adjointness and conservation laws of forced KdV equation

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Abstract: Using the concept of nonlinear self-adjointness and the general theorem on conservation laws that is developed by Ibragimov, nonlinear self-adjointness and conservation laws for the forced KdV equation are studied. We first discuss its self-adjointness and find that the forced KdV equation is nonlinearly self-adjoint. At the same time, formal Lagrangian for the equation is obtained. Having performed Lie symmetry analysis for the equation, we derive lots of nontrivial conservation laws for the equation according to the difference of Lie symmetries.

Keywords: nonlinear equation forced KdV equation conservation laws Lie symmetry formal Lagrangian

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