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**Conservation laws for a modified lubrication equation.** (English) Zbl 1331.35024


Summary: In this work we study the conservation laws of a modified lubrication equation, which describes the dynamics of the interfacial motion in phase transition. We show that the equation is nonlinear self-adjoint and has an exact Lagrangian with an auxiliary function. As a result, by a general theorem on conservation laws proved by Nail Ibragimov recently and Noether’s theorem, some new conservation laws for the equation are obtained. Our results show that the non-locally defined conservation laws generated by Noether’s theorem are equivalent to the local ones given by Ibragimov’s theorem.

**MSC:**

35B06 Symmetries, invariants, etc. in context of PDEs
35G25 Initial value problems for nonlinear higher-order PDEs

**Keywords:**

nonlinear self-adjointness; Lagrangian with an auxiliary function; interfacial motion in phase transition; Noether’s theorem; Ibragimov’s theorem

**Full Text:** DOI

**References:**


Olver, P. J., Applications of Lie groups to differential equations, (1993), Springer-Verlag New York · Zbl 0785.58003


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