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Nonlinear self-adjointness and conservation laws of Klein-Gordon-Fock equation with central symmetry. (English) [Zbl 1353.35187]

Summary: The concept of nonlinear self-adjointness, introduced by Ibragimov, has significantly extended approaches to constructing conservation laws associated with symmetries since it incorporates the strict self-adjointness, the quasi self-adjointness as well as the usual linear self-adjointness. Using this concept, the nonlinear self-adjointness condition for the Klein-Gordon-Fock equation was established and subsequently used to construct simplified but infinitely many nontrivial and independent conserved vectors. The Noether's theorem was further applied to the Klein-Gordon-Fock equation to explore more distinct first integrals, result shows that conservation laws constructed through this approach are exactly the same as those obtained under strict self-adjointness of Ibragimov’s method.

MSC:
35L10 Second-order hyperbolic equations
35B06 Symmetries, invariants, etc. in context of PDEs

Keywords:
Noether’s theorem; strict self-adjointness; quasi self-adjointness; linear self-adjointness; Ibragimov’s method

Full Text: DOI

References:


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