

The relationship between the conservation laws and multi-Hamiltonian structures of the Kundu equation

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October 12, 2020

Abstract

By the Lagrangian multiplier and constraint variational derivative, a relationship between conserved quantities and multi-Hamiltonian structures is built. Making using the relation a method is founded to prove the infinite-dimensional Liouville integrability of evolution equations with continuous variables. As the application, the conservation laws of the Kundu equation are firstly obtained. Its conserved quantities are deduced for comparing by Fokas' method different from the method used in the existed literature. The integrability of the equation is proved through taking the conservation laws as a starting point.

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