Nonlinear Sciences > Exactly Solvable and Integrable Systems

Lagrangian multiform structure for the lattice Gel'fand-Dikii hierarchy

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The lattice Gel'fand-Dikii hierarchy was introduced by Nijhoff, Papageorgiou, Capel and Quispel in 1992 as the family of partial difference equations generalizing to higher rank the lattice Korteweg-de Vries systems, and includes in particular the lattice Boussinesq system. We present a Lagrangian for the generic member of the lattice Gel'fand-Dikii hierarchy, and show that it can be considered as a Lagrangian 2-form when embedded in a higher dimensional lattice, obeying a closure relation. Thus the multiform structure proposed in arXiv:0903.4086v2 [nlin.SI] is extended to a multi-component system.

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