

Gerdjikov, Vladimir S.; Mikhailov, Alexander V.; Valchev, Tihomir I.

Recursion operators and reductions of integrable equations on symmetric spaces. (English)

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Summary: We study certain classes of integrable nonlinear differential equations related to the type symmetric spaces. Our main examples concern equations related to **A.III**-type symmetric spaces. We use the Cartan involution corresponding to this symmetric space as an element of the reduction group and restrict generic Lax operators to this symmetric space. Next we outline the spectral theory of the reduced Lax operator L and construct its fundamental analytic solutions. Analyzing the Wronskian relations we introduce the ‘squared solutions’ of L and derive the recursion operators by three different methods.

MSC:

37K15 Inverse spectral and scattering methods for infinite-dimensional Hamiltonian and Lagrangian systems

35Q55 NLS equations (nonlinear Schrödinger equations)

82B40 Kinetic theory of gases in equilibrium statistical mechanics

Cited in **2** Reviews
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Keywords:

Cartan involution; Lax operator; Heisenberg equation; Zakharov-Shabat system; Heisenberg ferromagnets