

Integrable twisted hierarchies with D_2 symmetries

Derchy Wu

Institute of Mathematics, Academia Sinica, Taipei 10617, Taiwan
email: wudc@math.sinica.edu.tw

Abstract:

Two new integrable twisted hierarchies with D_2 symmetries are constructed via the loop algebra factorization method. The splitting type factorization yields the generalized sinh-Gordon equation, this result justifies some far-reaching generalizations of the well-known connection between the sine-Gordon equation, the Backlund transformation, and surfaces with curvature -1 . The non-splitting type factorization yields the Gerdjikov-Mikhailov-Valchev equation which is an anisotropic multicomponent generalization of the classical Heisenberg ferromagnetic equation and is one of the simplest twisted integrable systems.

Special analytical features in the associated inverse scattering theory are discussed to solve the Cauchy problem of these twisted flows.

References:

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2. D. Wu, *Journal of Mathematical Physics*, 53, 103708-103730 (2012).