

Finite-Dimensional Hamiltonian Systems from Li Spectral Problem by Symmetry Constraints

Lin Luo^{a,b} and Engui Fan^a

^a Institute of Mathematics and Key Lab for Nonlinear Mathematical Models and Methods,
Fudan University, Shanghai 200433, P. R. China

^b Department of Mathematics, Xiaogan University, Xiaogan 432100, P. R. China

Reprint requests to L. L.; E-mail: linluo@fudan.edu.cn

Z. Naturforsch. **62a**, 399 – 405 (2007); received November 6, 2006

A hierarchy associated with the Li spectral problem is derived with the help of the zero curvature equation. It is shown that the hierarchy possesses bi-Hamiltonian structure and is integrable in the Liouville sense. Moreover, the mono- and binary-nonlinearization theory can be successfully applied in the spectral problem. Under the Bargmann symmetry constraints, Lax pairs and adjoint Lax pairs are nonlinearized into finite-dimensional Hamiltonian systems (FDHS) in the Liouville sense. New involutive solutions for the Li hierarchy are obtained.

Key words: Li Spectral Problem; Symmetry Constraint; Hamiltonian System; Involutive Solution.