A Riemann-Hilbert approach in the form of a block matrix for the coupled matrix integrable system. (English) J. Geom. Phys. 178, Article ID 104572, 11 p. (2022)

Summary: The two expressions of N-soliton solutions for the coupled matrix integrable system are derived via the Riemann-Hilbert (RH) approach in the form of a block matrix. Firstly, the spectral structure of the matrix integrable system and a block matrix RH problem on the real axis are investigated. By solving the special matrix RH problem with reflectionless where a jump matrix is taken to be the identity matrix, the corresponding N-soliton solutions are computed in terms of both a summation formula and determinants. As applications, we present exact solutions of the 3-wave resonant interaction (3WRI) equations and the vector nonlinear Schrödinger (NLS) equations, respectively. Particularly, some novel dynamical behaviors for these solutions are further discussed by image simulation.

MSC:
37-XX Dynamical systems and ergodic theory
35C08 Soliton solutions

Keywords:
coupled matrix integrable system; Riemann-Hilbert approach; block matrix; N-soliton solutions

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References:


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