Darboux Transformation and Symbolic Computation on Multi-Soliton and Periodic Solutions for Multi-Component Nonlinear Schrödinger Equations in an Isotropic Medium

Hai-Qiang Zhang[a], Tao Xu[a], Juan Li[a], Li-Li Li[a], Cheng Zhang[a], and Bo Tian[a, b, c]

[a] School of Science, Beijing University of Posts and Telecommunications, P. O. Box 122, Beijing 100876, China

[b] State Key Laboratory of Software Development Environment, Beijing University of Aeronautics and Astronautics, Beijing 100191, China

[c] Key Laboratory of Optical Communication and Lightwave Technologies, Ministry of Education, Beijing University of Posts and Telecommunications, Beijing 100876, China

Reprint requests to B. T.; E-mail: tian.bupt@yahoo.com.cn

The Darboux transformation is applied to a multi-component nonlinear Schrödinger system, which governs the propagation of polarized optical waves in an isotropic medium. Based on the Lax pair associated with this integrable system, the formula for the *n*-times iterative Darboux transformation is constructed in the form of block matrices. The purely algebraic iterative algorithm is carried out via symbolic computation, and two different kinds of solutions of practical interest, i.e., bright multi-soliton solutions and periodic solutions, are also presented according to the zero and nonzero backgrounds.

Key words: Darboux Transformation; Soliton; Integrable System; Symbolic Computation.