

## A Unified and Explicit Construction of N-Soliton Solutions for the Nonlinear Schrödinger Equation

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Abstract: An explicit N-fold Darboux transformation with multiparameters for nonlinear Schrödinger equation is constructed with the help of its Lax pairs and a reduction technique. According to this Darboux transformation, the solutions of the nonlinear Schrödinger equation are reduced to solving a linear algebraic system, from which a unified and explicit formulation of N-soliton solutions with multiparameters for the nonlinear Schrödinger equation is given.

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Key words: Schrödinger equation, N-fold Darboux transformation, N-soliton solutions

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