

Seventh Mississippi State - UAB Conference on Differential Equations - Computational Simulations, November 1–3, 2007, Doubletree Hotel, Birmingham, AL, USA

**NONLINEAR SCHRÖDINGER EQUATION WITH BOUND STATES  
OF HIGHER MULTIPLICITIES**

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The nonlinear Schrödinger (NLS) equation describes wave propagation in optical fibers, and it is one of the most well-known nonlinear partial differential equations. In 1972 Zakharov and Shabat introduced a powerful method (known as the inverse scattering transform) to solve the initial-value problem for the NLS equation. Due to mathematical and technical difficulties, this method has been available mainly in the case where the multiplicity of each bound state is one. In our research we remove that restriction and generalize the inverse scattering transform for the NLS equation to the case where the multiplicity of each bound state is arbitrarily chosen.

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