

Inverse scattering transform and multi-soliton solutions for the sextic nonlinear Schrödinger equation

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Abstract

In this work, we consider the inverse scattering transform and multi-soliton solutions of the sextic nonlinear Schrödinger equation. The Jost functions of spectrum problem are derived directly, and the scattering data with $t=0$ are obtained according to analyze the symmetry and other related properties of the Jost functions. Then we take use of translation transformation to get the relation between potential and kernel, and recover potential according to Gel'fand-Levitan-Marchenko (GLM) integral equations. Furthermore, the time evolution of scattering data is considered, on the basis of that, the multi-soliton solutions are derived. In addition, some solutions of the equation are analyzed and revealed its dynamic behavior via graphical analysis, which could be enriched the nonlinear phenomena of the sextic nonlinear Schrödinger equation.

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