Rogue Waves in the Multi-Soliton Wave Background for the Generalized Inhomogeneous Nonlinear Schrödinger Equation

Poster

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In this work, we investigate the generalized nonlinear Schrödinger equation with variable coefficients from an integrability perspective. Using the Darboux transformation, we present an exact one-soliton solution derived by solving the Lax pair compatibility conditions, which offer insights into the dynamics of optical wave propagation in inhomogeneous nonlinear optical fiber system with variable coefficients. Furthermore, we explore the formation of rogue waves for the governing equation. Our results contribute to a deeper understanding of nonlinear wave phenomena and offer potential applications in fields such as optical communications and fluid dynamics, where similar models are frequently encountered. These findings are expected to guide further exploration into the dynamics of solitons and rogue waves in more complex nonlinear systems.

References

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