On the optical soliton solutions of a couple of equations with Kerr law nonlinearity

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Abstract: In this study, we examined Schrödinger-Hirota (SHE) and Cubic Quartic Fokas-Lenells equations (CQ-FLE) with Kerr law nonlinearity via analytical method. The SHE and CQ-FLE have a great importance in nonlinear optics and they are frequently used by the researchers. In today's communication world, the transmission of optical waves over long distances without losing their shape and power is of great importance. While some equations model the signal pulse in fiber optic cables, some models are developed to eliminate the problems encountered during signal propagation. We used an analytical technique namely the unified Riccati equation expansion method (UREEM) to solve the investigated equations. Firstly, nonlinear partial differential equations (NLPDEs) are converted to nonlinear ordinary differential equation (NODE) form by using the complex wave transform. Then by utilizing the UREEM optical soliton solutions are derived and the resultant equations are depicted with 2D and 3D simulations. The necessary explanations and interpretations are presented in the relevant sections.

Keywords: Optical solitons, Schrodinger-Hirota equation, Fokas-Lenells equation, Unified Riccati equation expansion method.

Mathematics Subject Classification: 35QXX, 35C08, 35Q55, 35Q60.

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