

# Analysis of HNLS Solitons with Quintic Nonlinearity Using Semi Implicit Operator Splitting Padé Method

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**Abstract:** In this communication, we use the semi-implicit finite difference operator splitting Padé method to solve the higher-order nonlinear Schrödinger equation with higher order linear and nonlinear effects such as the third order dispersion (TOD), Kerr dispersion, stimulated Raman scattering and the quintic nonlinearity. The role of quintic nonlinearity on the propagation characteristics of optical solitons is investigated for standard fibers. This method is readily generalized for nonlinear management fibers it's found that the quintic nonlinearity has no significant role on the propagation of single solitons.

**Keywords :** Optical solitons, Padé method, quintic nonlinearity. HNLS equation