

# A Truncated Painlevé Expansion and Exact Analytical Solutions for the Nonlinear Schrödinger Equation with Variable Coefficients

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By using the truncated Painlevé expansion analysis an auto-Bäcklund transformation is found for the nonlinear Schrödinger equation with varying dispersion, nonlinearity, and gain or absorption. Then, based on the obtained auto-Bäcklund transformation and symbolic computation, we explore some explicit exact solutions including soliton-like solutions, singular soliton-like solutions, which may be useful to explain the corresponding physical phenomena. Further, the formation and interaction of solitons are simulated by computer. – PACS Nos.: 05.45.Yv, 02.30.Jr, 42.65.Tg

*Key words:* Truncated Painlevé Expansion; Bäcklund Transformation; Symbolic Computation; Nonlinear Schrödinger Equation; Solitons.