

# A Generalized $(G'/G)$ -Expansion Method for the Nonlinear Schrödinger Equation with Variable Coefficients

Sheng Zhang, Jin-Mei Ba, Ying-Na Sun, and Ling Dong

Department of Mathematics, Bohai University, Jinzhou 121000, P. R. China

Reprint requests to Dr. S. Z.; E-mail: dr.szhang@yahoo.com.cn

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In this paper, a generalized  $(G'/G)$ -expansion method, combined with suitable transformations, is used to construct exact solutions of the nonlinear Schrödinger equation with variable coefficients. As a result, hyperbolic function solutions, trigonometric function solutions, and rational solutions with parameters are obtained. When the parameters are taken as special values, some solutions including the known kink-type solitary wave solution and the singular travelling wave solution are derived from these obtained solutions. It is shown that the generalized  $(G'/G)$ -expansion method is direct, effective, and can be used for many other nonlinear evolution equations with variable coefficients in mathematical physics.

*Key words:* Nonlinear Evolution Equations; Generalized  $(G'/G)$ -Expansion Method; Hyperbolic Function Solutions; Trigonometric Function Solutions; Rational Solutions.