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The Solitary Waves for Cubic-Quintic Nonlinear Schrödinger Equation with Variable Coefficients

ZHANG Jin-Liang,[1] WANG Ming-Liang,[1,2] and LI Xiang-Zheng[1]

[1] Department of Mathematics and Physics, Henan University of Science and Technology, Luoyang 471003, China
[2] Department of Mathematics, Lanzhou University, Lanzhou 730000, China
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Abstract: The cubic-quintic nonlinear Schrödinger equation (CQNLS) plays important parts in the optical fiber and the nuclear hydrodynamics. By using the homogeneous balance principle, the bell type, kink type, algebraic solitary waves, and trigonometric traveling waves for the cubic-quintic nonlinear Schrödinger equation with variable coefficients (vCQNLS) are derived with the aid of a set of subsidiary high-order ordinary differential equations (sub-equations for short). The method used in this paper might help one to derive the exact solutions for the other high-order nonlinear evolution equations, and shows the new application of the homogeneous balance principle.

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