

Elliptic- and hyperbolic-function solutions of the nonlocal reverse-time and reverse-space-time nonlinear Schrödinger equations

Bo-wen Li¹, Tao Xu¹, Tian-Li Zhang¹, Li-cong An¹, and Yang Chen¹

¹China University of Petroleum Beijing

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Abstract

In this paper, we obtain the stationary elliptic- and hyperbolic-function solutions of the nonlocal reverse-time and reverse-space-time nonlinear Schrödinger (NLS) equations based on their connection with the standard Weierstrass elliptic equation. The reverse-time NLS equation possesses the bounded dn-, cn-, sn-, sech-, and tanh-function solutions. Of special interest, the tanh-function solution can display both the dark- and antidark-soliton profiles. The reverse-space-time NLS equation admits the general Jacobian elliptic-function solutions (which are exponentially growing at one infinity or display the periodical oscillation in x), the bounded dn- and cn-function solutions, as well as the K-shifted dn- and sn-function solutions. At the degeneration, the hyperbolic-function solutions may exhibit an exponential growth behavior at one infinity, or show the gray- and bright-soliton profiles.

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