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Periodic Waves of a Discrete Higher Order Nonlinear Schrödinger Equation

Robert Conte[1] and K.W. Chow[2]

[1] Service de physique de l'état condensé (URA 2464), CEA-Saclay, F-91191 Gif-sur-Yvette Cedex, France}
[2] Department of Mechanical Engineering, University of Hong Kong, Pokfulam, Hong Kong, China
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Abstract: The Hirota equation is a higher order extension of the nonlinear Schrödinger equation by incorporating third order dispersion and one form of self steepening effect. New periodic waves for the discrete Hirota equation are given in terms of elliptic functions. The continuum limit converges to the analogous result for the continuous Hirota equation, while the long wave limit of these discrete periodic patterns reproduces the known result of the integrable Ablowitz-Ladik system.

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