HIGH-ORDER NONLINEAR SCHRÖDINGER EQUATION FOR THE ENVELOPE OF SLOWLY MODULATED GRAVITY WAVES ON THE SURFACE OF FINITE-DEPTH FLUID AND ITS QUASI-SOLITON SOLUTIONS

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S u m m a r y

We consider the high-order nonlinear Schrödinger equation derived earlier by Sedletsky [Ukr. J. Phys. **48**(1), 82 (2003)] for the first-harmonic envelope of slowly modulated gravity waves on the surface of finite-depth irrotational, inviscid, and incompressible fluid with flat bottom. This equation takes into account the third-order dispersion and cubic nonlinear dispersive terms. We rewrite this equation in dimensionless form featuring only one dimensionless parameter kh, where k is the carrier wavenumber and h is the undisturbed fluid depth. We show that one-soliton solutions of the classical nonlinear Schrödinger equation are transformed into quasi-soliton solutions with slowly varying amplitude when the high-order terms are taken into consideration. These quasi-soliton solutions represent the secondary modulations of gravity waves.