HIGHER ORDER NONLINEAR SCHRODINGER EQUATION FOR STOKES WAVES ON THE SURFACE OF A WATER LAYER OF ARBITRARY DEPTH

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S u m m a r y

The multiple-scale method is applied in order to derive a higher order nonlinear Schrodinger equation (HONSE) which describes modulations of the amplitude of the fundamental harmonic of Stokes waves on a fluid layer of arbitrary depth. New terms of this equation describe the third-order dispersion effect and the effect of dispersion of the nonlinearity. When decreasing the nonlinearity and dispersion, this equation is uniformly reduced to a nonlinear Schrodinger equation for Stokes waves on the surface of a fluid of finite depth first found by Hasimoto and Ono. The explicit expressions for the real coefficients of this equation are given as functions of kh, where h, k are the depth and wave number. When kh tends to infinity, these expressions are reduced to the coefficients of HONSE first derived by Dysthe in the case of infinite depth.