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Small dispersion limits of integrable nonlinear PDEs with cosine initial conditions

We employ the WKB method to study the scattering problem of the Korteweg-deVries equation in order to analytically characterize the Zabusky-Kruskal numerical experiment. We obtain explicit asymptotic expressions for the number of solitons as well as their amplitudes. We confirm the results by comparing them with recent shallow water experiments. We then generalize our approach to study the defocusing nonlinear Schrodinger equation, and we apply the corresponding results to characterize some recent experiments in nonlinear optics. This is joint work with G. Biondini and S. Trillo.