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Stability of periodic waves of 1D nonlinear Schrödinger equations

The cubic focusing and defocusing Schrödinger equations in one dimension admit periodic wave solutions given by snoidal, cnoidal, and dnoidal Jacobi elliptic functions. We examine the stability of these solutions, and among other things prove the spectral stability of the cnoidal waves (in a certain parameter range) with respect to same-period perturbations. This is done via variational and spectral analysis, while as much as possible avoiding the use of complete integrability. This is joint work with Stefan Le Coz and Tai-Peng Tsai.