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On asymptotic stability of solitary waves for nonlinear Schrödinger equations

We suppose that it possesses stable solitary wave solutions and we investigate their asymptotic stability, that is the long-time behavior of solutions whose initial conditions are close to a stable solitary wave.

The method, initiated in [1], is based on the spectral decomposition of solutions on the eigenspaces associated to the discrete and continuous spectrum of the linearized operator near the solitary wave. Under some hypothesis on the structure of the spectrum, we prove that, asymptotically in time, the solution decomposes into a solitary wave and a dispersive part described by the free Schrödinger equation. We calculate explicitly the time behavior of the correction.

This is a joint work with V. Buslaev.

References

- [1] V. Buslaev and G. Perelman, *Scattering for the nonlinear Schrödinger equation: states close to a soliton*. St. Petersburg Math. J. **4**(1993), 1111–1142.