The Effectively Linear Behavior of the Nonlinear Schrödinger Equation.  

The linear part of the Nonlinear Schrödinger Equation (NLS) \((iq_t = q_{xx})\) has dispersion relation \(\omega = k^2\). We don’t expect solutions to the fully nonlinear equation to behave nicely or have any kind of effective dispersion relation like this. However, I have seen that solutions to the NLS are actually weakly coupled and are often nearly sinusoidal in time with a dominant frequency, often behaving similarly to modulated plane waves. In fact, highly nonlinear solutions behave more and more effectively linearly. (Received September 19, 2016)