ASYMPTOTICALLY STATIONARY NONLINEAR WAVES

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A generic solution to a generic nonlinear wave equation exhibits oscillatory behavior, which is reflected in the fact that its kinetic energy does not tend to zero in infinite time. The same is true of solutions to Newton's equation, which is the finite dimensional analogue. There are, however, special solutions whose kinetic energy converges to zero (in both cases). We call such solutions asymptotically stationary. These play an important role in the description of the phase portrait, whether they are stable or not. Familiar examples include stationary solutions (corresponding to critical points of the potential energy) or their stable manifolds. In this talk, we discuss asymptotically stationary solutions for two canonical nonlinear wave equations admitting topological solitons: scalar field models in 1d, and wave maps in 2d. We classify and describe all asymptotically stationary solutions exhibiting two-soliton structure for these equations. This is joint work with Jacek Jendrej (CNRS and U. Paris 13) and partly with Michal Kowalczyk (U. Chile).