Multidimensional solitons in dispersive complex media: Structure and stability

This paper is devoted to one of the most interesting and rapidly developing areas of modern nonlinear physics and mathematics; the analytical and advanced numerical study of the structure and stability of two- and three-dimensional solitons in dispersive complex media described by the Belashov-Karpman (BK) system which includes the Kadomtsev-Petviashvili and derivative nonlinear Schrodinger classes of equations and takes into account the generalizations relevant to various complex physical media, associated with the effects of high-order dispersion corrections, influence of dissipation and instabilities. This is consistent representation of the both early known and new original results obtained by author and also some generalizations in theory and numerical simulation of the nonlinear waves and solitons in complex dispersive media. The analysis of stability of solutions is based on study of transformational properties of the Hamiltonian of the system. The structure of possible multidimensional solutions is investigated using the methods of qualitative analysis of proper dynamical systems and analysis of the solutions’ asymptotics. Soliton interaction is studied numerically using especially developed numerical methods.

Biography


Notes: