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Nonlinear wave structures of soliton and vortex types in complex continuous media

Study of nonlinear wave structures of soliton and vortex types in complex continuous media (including space plasma, atmosphere and hydrosphere) is the important direction of modern nonlinear physics having numerous important applications. Such structures of various types can be observed in the Earth atmosphere and hydrosphere, in plasma of ionosphere and magnetosphere, as dust vortices on surfaces of the Earth and Mars, as dust sound solitons on the Moon, etc. At construction of dynamic models of continuous media the analytical and numerical methods of study of the equations of hydrodynamics and plasma physics are used. This allows considering numerous dynamical effects in real physical media, including thin dispersive ones, dissipation and instabilities of various type. Changes of media parameters are quite often accompanied by the bifurcation phenomena, such as a tornado and hurricanes in an atmosphere, shock waves and vortices in a plasma, etc. Association of efforts of researchers of nonlinear wave structures in complex continuous media and an exchange of opinions between them are rather important for the further development of this research area and can provide rather essential synergetic effect.

Biography

Vasily Yu Belashov has a PhD in Radio Physics and Doctor of Science in Physics and Mathematics. His main fields of research study are theory and numerical simulation of the dynamics of multi-dimensional nonlinear waves, solitons and vortex structures in plasmas and other dispersive media. Presently, he is Professor in the Kazan Federal University. He was a Coordinator of studies in the International Program "Solar Terminator" (1987-1992), and took part in Programs WITS/WAGS and STEP. He is author of 288 publications. Some of the main books he has authored and published are: "*Solitary Waves in Dispersive Complex Media: Theory, Simulation, Applications*" by Springer-Verlag GmbH, 2005; "*The KP Equation and its Generalizations: Theory and Applications*". Magadan, NEISRI FEB RAS, 1997.

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