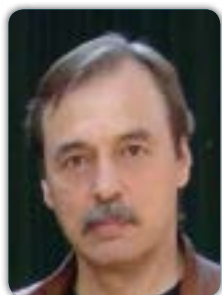


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## Vasily Yu Belashov

*Kazan Federal University, Russia*

### Classification of multidimensional solitary solutions of the GKP equation by use of qualitative and asymptotic analysis

The problem of classification of the multidimensional nonlinear waves and solitons forming on the low-frequency branch of oscillations in complex continuous media with dispersion, including plasmas and fluids, is studied analytically on the basis of the generalized Kadomtsev-Petviashvili (GKP) equation (as partial case of the Belashov-Karpman (BK) system) which takes into account the generalizations relevant to various complex physical media, associated with the effects of high-order dispersion corrections. To construct the classification of solutions on their types, we consider the dynamical systems associated with the GKP equation and study the structure of these solutions using the methods of qualitative analysis and analysis of the solutions' asymptotics. We also present some considerations on constructing of the phase portraits of the systems in the 8-dimensional phase space for the GKP equation on the basis of the results of qualitative analysis of the generalized equations of the KdV-class. As a result, we have constructed a classification of possible multidimensional solutions for the GKP system. This is consistent representation of both, the early known and new original results obtained by the author and also some generalizations in theory of the nonlinear waves and solitons in complex dispersive media.

### Biography

Vasily Yu Belashov, has a PhD in Radiophysics and a DSci in Physics and Mathematics. His main fields of research interest are theory and numerical simulation of the dynamics of multidimensional nonlinear waves, solitons and vortex structures in plasmas and other dispersive media. Presently, he is a Chief Scientist and Professor at the Kazan Federal University. He is the author of 310 publications including seven monographs. He has authored the following books: "Solitary Waves in Dispersive Complex Media: Theory, Simulation, Applications", Springer-Verlag GmbH, 2005 and "Solitons: Theory, Simulation, Applications", Kazan, Publishing Center "School", 2016.

[vybelashov@yahoo.com](mailto:vybelashov@yahoo.com)**Notes:**