



# ЛАБОРАТОРИЯ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ

## СЕМИНАР по ВЫЧИСЛИТЕЛЬНОЙ И ПРИКЛАДНОЙ МАТЕМАТИКЕ

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Room 310**

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### **SOME EXACT SOLUTIONS OF THE FIRST EQUATION IN THE VLASOV CHAIN OF EQUATIONS**

Building a method for finding exact solutions of the first equation from the Vlasov chain of equations, which is formally similar to the continuity equation, is considered in the paper. The studied equation is written relative to the scalar function  $f$  and the vector field  $v$ . Depending on the formulation of the problem, the function  $f$  may correspond to the density of probabilities, charge, mass or the magnetic permeability of the magnetic. The vector field  $v$  may correspond to the probability current, the field of velocities of the continuum or the intensity of the magnetic field. From the mathematical viewpoint, the same equation is applicable while describing statistical, quantum and classical systems. The exact solution obtained for one physical system can be reflected on the exact solution for another system.

The presence of exact solutions of model non-linear systems plays an important role in designing complex physical facilities, for example, the SPD detector of the NICA project. Such solutions are used as tests when writing a program code and can also be encapsulated in finite difference schemes for the numerical solution of boundary value problems for non-linear differential equations. The use of the given method is demonstrated by the example of solving the Schrodinger equation and the magnetostatic problem in the domain with a non-smooth boundary.