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## **Nonclassical Conditions for Linear Sobolev Type Equations**

Mathematical model which prototypes are Barenblatt–Zhel'tov–Kochina equation and Hoff equation has been considered in the sequence spaces which are analogues of Sobolev function spaces.

The peculiarities of our approach are, firstly, the active use of the theory of bounded operators and the degenerate holomorphic groups of operators generated by them. Secondly, it is also the theory of positive groups of operators, defined on Banach lattices, to lay the basis of the theory of positive degenerate holomorphic groups of operators which phase spaces are Banach lattices. Thirdly, we research the concrete mathematical model which has been considered in Sobolev sequence spaces, that can be interpreted as the space of Fourier coefficients of solutions of initial-boundary value problems for Barenblatt–Zhel'tov–Kochina equation or Hoff equation.

The sufficient conditions have been described for positive solution in this mathematical model. It is noted that the Barenblatt–Zhel'tov–Kochina equation satisfies the found sufficient conditions, and therefore the initial-boundary value problem can have non-negative solutions. The basis of our research is the theory of the positive semigroups of operators and the theory of degenerate holomorphic groups of operators. As a result of the merging of these theories a new theory of degenerate positive holomorphic groups of operators has been formulated. At present, the main results have already been obtained, based not on the Ito–Stratonovich–Skorokhod approach, but on the Nelson–Glickich derivative. Further we will consider both various generalizations of the Showalter–Sidorov condition and the relation between the powers of the polynomials of operators. The results of a new theory can be applied in economic and engineering problems.