# Towards General Theory of Differential-Operator and Kinetic Models
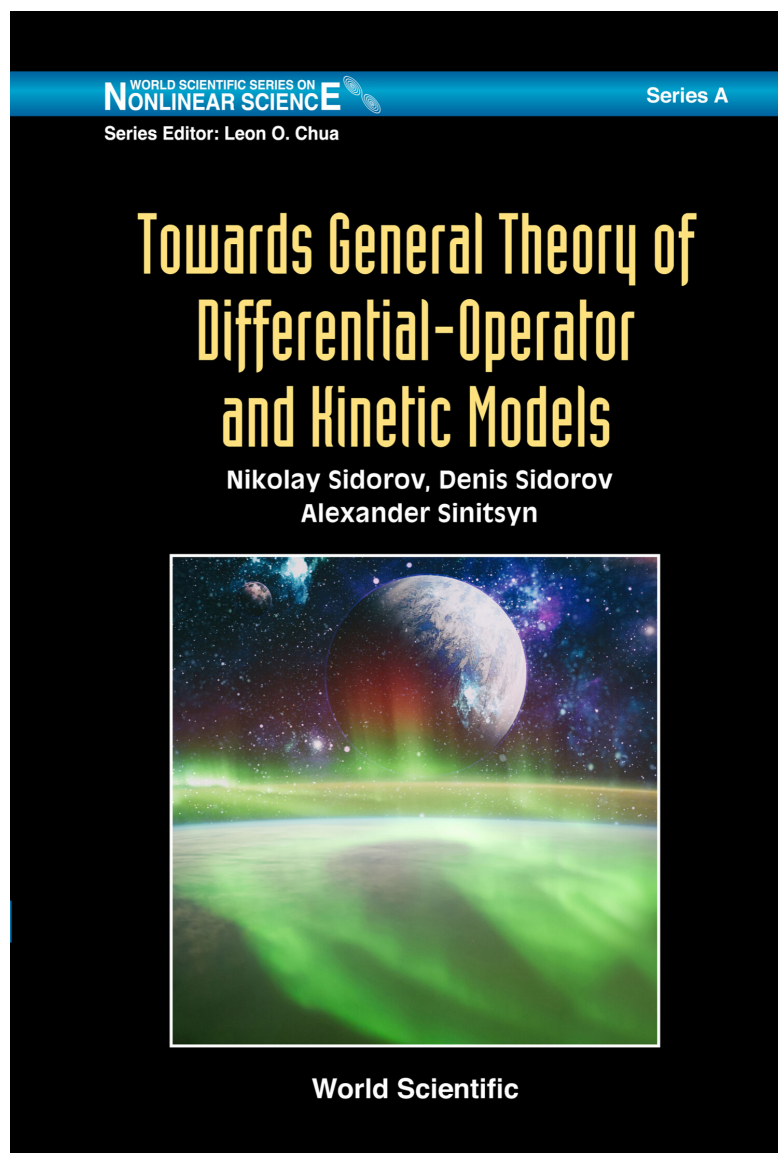
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**Towards General Theory of Differential-Operator and Kinetic Models**

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# About the Book

This volume provides a comprehensive introduction to the modern theory of differential-operator and kinetic models including Vlasov–Maxwell, Fredholm, Lyapunov–Schmidt branching equations to name a few. This book will bridge the gap in the considerable body of existing academic literature on the analytical methods used in studies of complex behavior of differential-operator equations and kinetic models. This monograph will be of interest to mathematicians, physicists and engineers interested in the theory of such non-standard systems.

# Contents

- Operator and Differential-Operator Equations
- Theory of Linear Operators
- Nonlinear Differential Equations near Branching Points
- Nonlinear Systems Equilibrium Points: Stability, Branching, Blow-up
- Irregular Systems of Equations with Partial Derivatives
- Lyapunov Methods in the Bifurcation Theory
- Bifurcation Points of Nonlinear Equations
- General Existence Theorems for the Bifurcation Points
- Asymptotics in a Neighborhood of a Bifurcation Point
- Regularization of Computation of Solutions in a Branch Point Neighborhood
- Iterations, Interlaced Equations and Lyapunov Majorants
- Newton Diagrams
- Interlaced and Potential BEQ
- Vlasov–Maxwell System
- Boundary Value Problem
- Bifurcation of Solutions
- Magnetic Insulation Problem

# Readership

Graduate students and researchers interested in mathematical physics, differential equations and mathematical modeling.

# About the Authors

**Nikolay Sidorov** received the PhD and the Dr habil. degrees in mathematics in 1967 and 1983 year respectively from Irkutsk State University and from Institute of Mathematics and Mechanics of Russian Academy of Sciences (Ural Branch). He is Full Professor of Irkutsk State University since 1985. His research interests include nonlinear functional analysis, differential-operator equations in kinetic systems with applications in mechanics and mathematical physics, inverse problems and and theory of approximate methods for solving irregular equations with parameters. Prof. Nikolay Sidorov has authored more than 200 scientific papers and three monographs, he supervised 14 PhDs and 5 Drhabls in abstract and applied mathematics. He was invited by British Council for researcher professor to universities of Great Britain, Fudan University and other universities to give seminaries, organized series of mini-symposiums in international mathematical congresses.

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