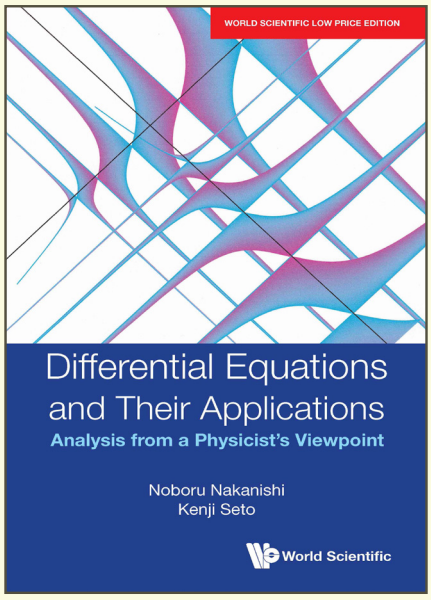
Differential Equations and Their Applications

Analysis from a Physicist's Viewpoint



By **Noboru Nakanishi**
(Kyoto University, Japan)

Kenji Seto
(Hokkai-Gakuen University, Japan)

ISBN	9781944660710
Extent	396pp
Binding	Paperback
Year	2023
Price	Rs. 1750

ABOUT THE BOOK

This book is written for students and researchers who are fond of mathematics and the natural sciences. It consists of two parts. Part I presents the theory of analysis in which the mathematical theory is described not as an accomplished palace, but as a building under construction. It uncovers how a theory has been or is being constructed. In Part II, the theory of differential equations is applied to interesting practical problems, such as pursuit-line and tractrix, attack on an object from an airplane, an insect crawling along a stretching rubber rod, the SIR model of a virus infection, string vibration, circular membrane vibration, as well as the wind ripple, sand dune and wave phenomena on a highway. Furthermore, the problems of a one-dimensional lattice vibration, the keyboard percussion vibration and the eigenvalue problems in quantum mechanics, such as the Aharonov–Bohm effect, are also investigated in detail.

READERSHIP

Undergraduate students, postgraduate students and researchers interested in the theory and applications of differential equations in mathematics and the natural sciences.

CONTENTS

Preface

Part I: Theories:

- Introduction to the Theory of Analysis
- Differential Equations
- Differential Operators

Epilogue to Part I

Part II: Applications:

- Ordinary Differential Equations
- Partial Differential Equations

- Problems Involving Bessel Functions
- Potential Problems in Quantum Mechanics

Formulas of Special Functions
Epilogue to Part II
Index

ABOUT THE AUTHORS

Noboru Nakanishi graduated from the Physics Department, Science Faculty, Kyoto University in 1955, and obtained his PhD from there. After working at the Institute for Advanced Study, Princeton and Brookhaven National Laboratory as a visiting researcher, he became a professor at the Research Institute for Mathematical Science, Kyoto University. He has four famous achievements: The first one was the introduction of "Landau–Nakanishi manifold" in the Feynman diagram which is used for the calculation of the scattering of elementary particles. The second one was the research of the "Bethe–Salpeter equation". He organized its working research group and played an active part as an organizer. The third one was the construction of the "indefinite metric quantum field theory" in which he advocated the "Nakanishi–Lautrup formalism". The last one was the research of the "quantum Einstein gravity". He is surely a world authority on the quantum field theory and mathematical physics.

Kenji Seto graduated from the Physics Department, Science Faculty, Hokkaido University in 1963, and obtained PhD in Hokkaido University. He is an expert of general physics. In his postgraduate studies, he participated in the working group which was presided by Professor N Nakanishi. After working two years as a teaching assistant at Gakusyuin University, Tokyo, he became a professor of Hokkai-Gakuen University. After his middle age, he was devoted to university education. Recently, he has contributed about 100 papers to "Communication of Mathematics and Physics" which is a magazine delivered by internet. These treatises were very useful in writing this book.

For orders and enquiries, please contact us:

FEEL Books

FEELBOOKS PVT. LTD.

DELHI	**4381/4 Ansari Road, Daryaganj, New Delhi 110002**		**Tel: +91-11-47472630**
	Pushpendra Kumar	**Mobile: +91 9015043442**	**Email: orders@feelbooks.in**
BENGALURU	**C-22, Brigade MM, KR Road, Jayanagar 7th Block, Bengaluru 560070**		**Tel: +91-80-26762129**
	Shekar Reddy	**Mobile: +91 9945234476**	**Email: bangalore@feelbooks.in**
MUMBAI	**Vijay Kumar**	**Mobile: +91 9871176434**	**Email: vkumar@feelbooks.in**
CHENNAI	**G Srinivasan**	**Mobile: +91 9003047502**	**Email: gsrinivasan@feelbooks.in**
KOLKATA	**Dhrubajyoti Bhattacharjee**	**Mobile: +91 9836160013**	**Email: dbhattacharjee@feelbooks.in**
HYDERABAD	**K.S.Vishwanath**	**Mobile: +91 9871745850**	**Email: kvishwanath@feelbooks.in**

***For Catalogues & title lists*: marketing@feelbooks.in**

FOLLOW US ON LinkedIn

www.feelbooks.in

FOLLOW US ON facebook

For any queries, please email us at marketing@feelbooks.in