



A First Course in Functional Analysis

Theory and Applications

Rabindranath Sen

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A comprehensive introduction to functional analysis, starting from the fundamentals and extending into theory and applications across multiple disciplines.

This book provides the reader with a comprehensive introduction to functional analysis. Topics include normed linear and Hilbert spaces, the Hahn-Banach theorem, the closed graph theorem, the open mapping theorem, linear operator theory, the spectral theory, and a brief introduction to the Lebesgue measure. The book explains the motivation for the development of these theories, and applications that illustrate the theories in action. Applications in optimal control theory, variational problems, wavelet analysis and dynamical systems are also highlighted. 'A First Course in Functional Analysis' will serve as a ready reference to students not only of mathematics, but also of allied subjects in applied mathematics, physics, statistics and engineering.

Readership

This book will appeal to postgraduate students in mathematics, physics, economics, statistics and engineering.

Contents

Introduction; I. Preliminaries; II. Normed Linear Spaces; III. Hilbert Space; IV. Linear Operators; V. Linear Functionals; VI. Space of Bounded Linear Functionals; VII. Closed Graph Theorem and Its Consequences; VIII. Compact Operators on Normed Linear Spaces; IX. Elements of Spectral Theory of Self-Adjoint Operators in Hilbert Spaces; X. Measure and Integration Lp Spaces; XI. Unbounded Linear Operators; XII. The Hahn-Banach Theorem and Optimization Problems; XIII. Variational Problems; XIV. The Wavelet Analysis; XV. Dynamical Systems; List of Symbols; Bibliography; Index

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