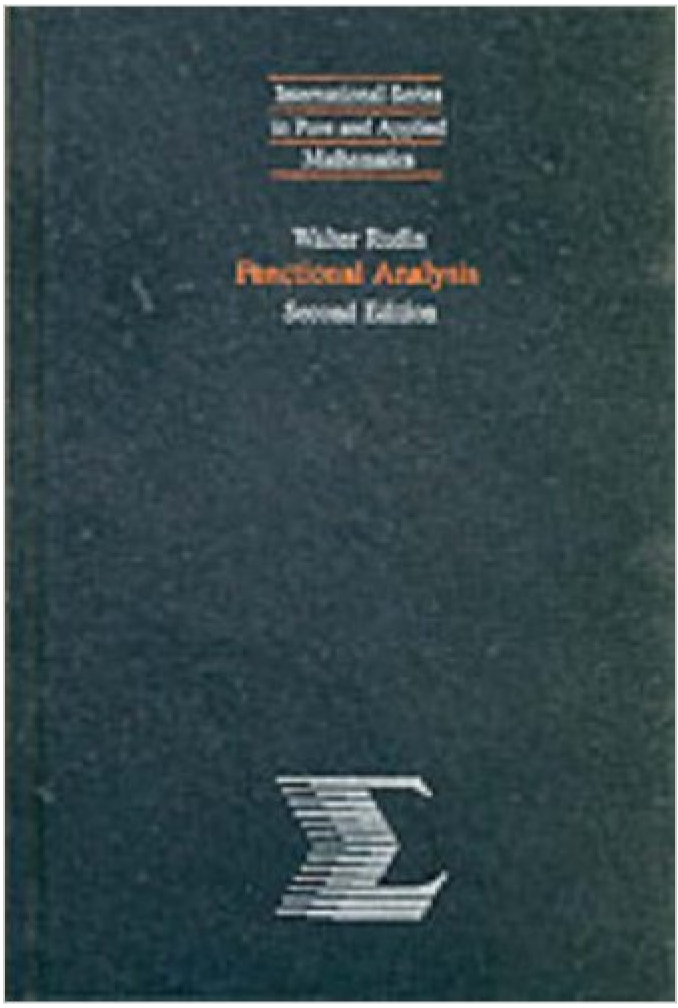
Functional Analysis



Synopsis

This classic text is written for graduate courses in functional analysis. This text is used in modern investigations in analysis and applied mathematics. This new edition includes up-to-date presentations of topics as well as more examples and exercises. New topics include Kakutani's fixed point theorem, Lamonosov's invariant subspace theorem, and an ergodic theorem. This text is part of the Walter Rudin Student Series in Advanced Mathematics.

Book Information

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Customer Reviews

This is a well-written book that covers an astoundingly large number of ideas. Some of the proofs Rudin gives demand verifications he does not give, but it is apparent to the reader what needs to be checked and if you do check these things you will not find technicalities that Rudin ignored. (Often experienced mathematicians omit parts of proofs they consider standard and in fact if we fully work out the proof we see that what was written is logically out of order, e.g. statements P and then Q are made when in fact Q needs to be established first to prove P, and therefore rightly frustrates a reader.)The first three chapters are on topological vector spaces generally and locally convex spaces in particular. These structures are not part of the standard graduate course in functional analysis, which deals only with Banach spaces and Hilbert spaces and may give a uselessly specialized proof of the spectral theorem merely for bounded self-adjoint compact operators, while in fact what one genuinely needs the spectral theorem for is unbounded self-adjoint operators (which Rudin gives in Chapter 13). Moreover, it is impossible even to talk rigorously about distributions without the machinery of locally convex spaces and FrÃ©chet spaces; in a course on partial differential equations it is common to avoid talking about what it means to say that a distribution is continuous, or to give an inadequate and ad-hoc explanation involving sequences of test functions.Aside from the chapters on topological vector spaces and locally convex spaces, another glory of this book are the chapters on distributions, tempered distributions, and linear partial differential operators. The proof of Sobolev’s lemma (Theorem 7.25) is meticulous.