

[Şuhubi, Erdoğan S.](#)

Functional analysis. (English) [Zbl 1088.46001](#)

Dordrecht: Kluwer Academic Publishers (ISBN 1-4020-1616-6/hbk). xii, 691 p. (2003).

In spite of the somewhat misleading title, this is not just a textbook on functional analysis, but on much more and much less at the same time. On the one hand, in the first 5 chapters many prerequisites are discussed in great detail (on 350 pages, i.e., half of the book), starting with basic notions from first-year freshmen courses such as sets, functions, orderings, and equivalence relations, then ranging over linear algebra (vector spaces, bases, linear transformations, matrices, eigenvalues and eigenvectors) and real analysis (real numbers, sequences, continuity, differentiation, and integration), and arriving at the fundamental concepts of topology (topological spaces, bases and subbases, topological vector spaces, metric spaces, completeness, compactness, approximation, the contraction mapping principle, and more).

The heart of functional analysis is reached only with the beginning of Chapter 5 (normed spaces), where the usual topics such as bounded, closed and compact linear operators are discussed, as well as bounded linear functionals, dual spaces, and weak topologies. The following Chapter 6 deals with Hilbert spaces, with particular emphasis on Fourier series expansions, but covering also more application-oriented topics like variational problems. In Chapter 7, the author studies spectra of linear operators, covering also the case of unbounded operators which is particularly important in quantum mechanics. In these three chapters, both the choice of the material and the presentation appear to be pretty close to the classical textbook by *A. E. Taylor* ["Introduction to functional analysis" (John Wiley, New York and Chapman & Hall, London) (1958; [Zbl 0081.10202](#))]. The final Chapter 9 is concerned with a special field from nonlinear functional analysis, namely, Fréchet and Gâteaux derivatives and their applications.

This is certainly a very interesting textbook which can be warmly recommended to students and teachers as a complement to the existing vast literature on functional analysis and operator theory. The book is well-written, and the reviewer found the motivating first section of each chapter ('Scope of the Chapter') particularly useful, as well as the list of exercises at the end of each chapter. Unfortunately, the truly outrageous price will be a serious obstacle for providing the book with the large readership it deserves.

Reviewer: [Jürgen Appell \(Würzburg\)](#)

MSC:

- [46-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to functional analysis Cited in 4 Documents
- [47-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to operator theory