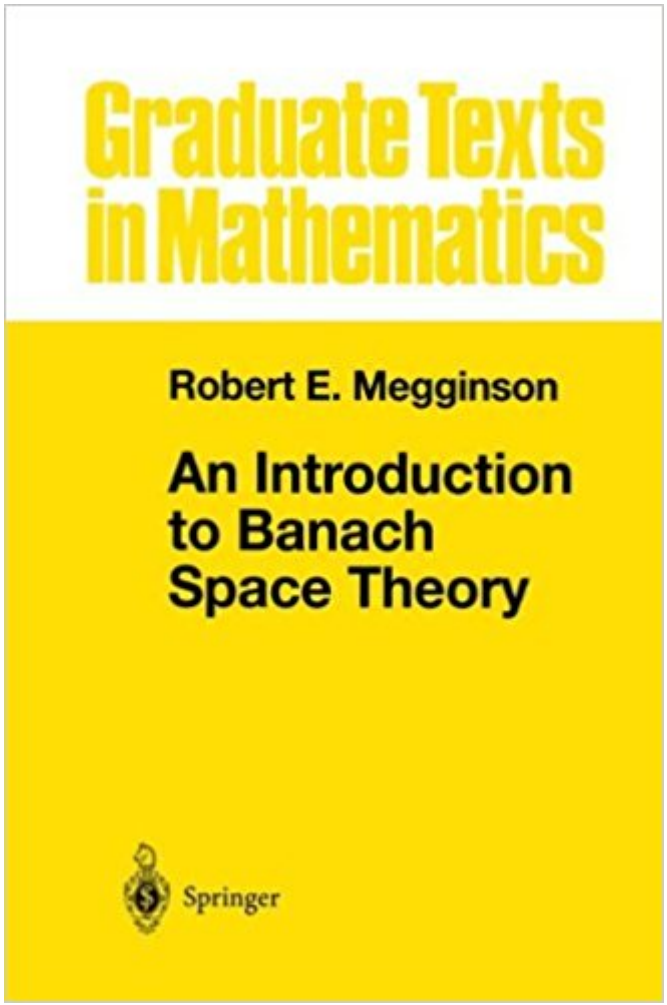
An Introduction To Banach Space Theory (Graduate Texts In Mathematics)



Synopsis

Preparing students for further study of both the classical works and current research, this is an accessible text for students who have had a course in real and complex analysis and understand the basic properties of L p spaces. It is sprinkled liberally with examples, historical notes, citations, and original sources, and over 450 exercises provide practice in the use of the results developed in the text through supplementary examples and counterexamples.

Book Information

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Customer Reviews

This is a text on the rudiments of Functional Analysis in the normed and Banach space setting. The case of Hilbert space is not emphasized.(Here are some examples of books on Hilbert space that I’ve found useful: Paul Halmos - Introduction to Hilbert Space and the Theory of Spectral Multiplicity, J.R. Retherford - Hilbert Space: Compact Operators and the Trace Theorem, and J. Weidmann - Linear Operators in Hilbert Spaces.)Other than that exception, this would make for a perfect textbook for use for, say, a two-semester Functional Analysis sequence for students who have had a graduate-level sequence in Real Variables (measure, integration, L^p-spaces) as from a textbook like Folland’s Real Analysis. (Professor Megginson says something to this effect in the preface.)The book consists of five (very long) chapters. I’ve studied Chapters 1 & 2, and the majority of Chapters 3 & 4, but I haven’t touched Chapter 5 (and so I cannot say anything about it). It’s EXTREMELY well-written. The exposition is sometimes a bit bloated (and sometimes too pedantic); in my opinion, the book could have been a bit shorter without loss of clarity. However, in light of its great value, I

can easily overlook this. A VERY HELPFUL aspect of this book is that it's extremely well documented. By this, I mean that it's well-indexed, the bibliography and historical remarks are extensive; just about all of the important theorems include citations to their original sources. Also, I haven't found any typographical errors yet!Professor Megginson doesn't exasperate the reader by relegating important results to the exercises. The overwhelming majority of the exercises in this book simply provide examples/counterexamples (and LOTS of them) relevant to the theory presented in the corresponding sections. In the exercises, you'll also find a few minor results. This is another aspect that makes this book ideal for self-study.Chapter 1 consists of the basics of bounded linear operators and functionals on normed and Banach spaces. There, you'll find the Baire Category Theorem with "the big three" (Open Mapping/Closed Graph/Uniform Boundedness Theorems), as well as the Hahn-Banach Theorem, Dual spaces and Reflexivity, and the Quotient Space/Direct Sum constructions (along with some other topics). I found his approach to "the big three" to be extremely cool (for lack of a better word). Though he proves the classical Baire Category Theorem, he doesn't use it directly to prove the big three (as almost all texts on this subject do), but he uses a "lemma" of Zabreiko (which uses a version of Baire Category); by using Zabreiko's lemma, the proofs of the big three become easy (by anyone's standard)!Chapter 2 consists of the weak topologies and weak compactness, although Professor Megginson takes a long route to their introduction. He first reviews the necessary ideas of topology, nets, and topological groups. Then, he gives the needed portions of the theory of (the more general) locally convex spaces (along with some digressions). The ground work culminates with Section 2.4 (Topologies Induced by Families of Functions) before the introduction of the weak and weak* topologies. As is seen in other texts, these topologies can be approached more directly, either through net convergence, or by giving a specific subbase which generates the topology; however, in my opinion, Megginson's approach panoramically provides a view of these topologies from all angles.Chapter 3 consists of some further results about linear operators. Adjoint operators, projections, compact operators, and weakly compact operators are introduced. In this chapter, Banach algebras are briefly introduced for spectral considerations. Also, in the section on Compact Operators is a good exposition on the Fredholm-Riesz-Schauder theory.Chapter 4 consists of the relevant Basis theory. Though I enjoyed this, I more enjoyed the briefer coverage of these topics in Albiac and Kalton's Topics in Banach Space Theory.Personally, I am an American graduate student in mathematics; I have studied at two different American math departments, both of which are well-known for Analysis. In my experience at both of these schools, a functional analysis sequence is rarely ever given; in fact, at my current department, a functional analysis sequence hasn't been

given in almost a decade! So, unfortunately for me, I've never had the chance to take a good functional analysis course. As I am researching topics in Measure Theory (Vector Measures) and Operator Theory (in the setting of Banach and function spaces), a good foundation in functional analysis was needed, and Professor Megginson's book (through self-study) has been absolutely PERFECT for my needs! Of course, Functional Analysis is such a broad subject that different texts may sharply differ in their coverage. So, a different functional analysis text may better suit your needs. For instance, Rudin's Functional Analysis text covers the rudiments in a generality that's not as useful to me as Megginson's coverage, but Rudin's text covers Distributions, Fourier Transforms, and more (which would be useful for someone who wishes to study Harmonic Analysis or go into PDE's). Another functional analysis text with an interesting set of topics (which I refer to from-time-to-time), and possibly worth mentioning, is Lawrence Baggett's Functional Analysis; it was published with Marcel-Dekker, but is (now out-of-print and) available for free (in .pdf format) at the author's website (just Google it).Conclusion: If you are of a similar disposition, I wouldn't hesitate to get a copy of this beautiful book by Professor Megginson!One thing I should mention: I bought this book on , and my copy is basically a poor photocopy of the original printing (on thick laser paper). It seems that (you read me correctly) is actually printing these Springer books with print-on-demand equipment. As other reviewers have mentioned, you may find a high-quality original printing in your school's library (as I've also found). So, basically, what you'll get from is an officialized photocopy bootleg. Many other Springer texts that I've ordered from came the same way (and even some of them had missing pages)!Unfortunately, I fear that you'll get the same poor quality even if you order directly from Springer. I ordered a couple of books directly from Springer a few months ago to avoid paying full price for crappy copies. Lo and behold: they were low-quality photocopies, too!

The book is completely an introduction in every a aspcet about Banach Spaces. It contains a lot of exercises. There's not better book than this one

It is very clear and well organized. I find very pleasant reading it. The writing style is excelent. It helps me understand and learn the Banach spaces.

The printing quality totally ruined this beautifully-written book

A friend recommended this book to me, because I need to understand nets better. The section on topology and nets is fantastic ! I then found the chapters on rotundity and smoothness, and their

uniform versions. I also need to learn about these properties. They are explained very well indeed. Needing to understand the "basics" of Functional Analysis, I read the appendices on metric spaces and ell-p spaces, and now I am working through the first chapter, on the Baire Category Theorem, the Open Mapping Theorem, the Uniform Boundedness Principle, the Closed Graph Theorem, the Hahn-Banach theorems, and so on.The explanations are beautifully clear, yet concise. The ideas seem to flow very smoothly. Definitions and theorems which have baffled me for years are revealed to be very natural. I wish I had known of this book when it was first published nine years ago !My only, very minor, complaint is that the quality of the type in my copy seems lower than that of the type in the library's copy. The older copy is easier on the eyes.

Text books of functional analysis usually include Banach space by one or two chapters. But this book is a book of Banach space theory. So you can learn this area more deeply. For mathematical economists, weak and weak star topologies are must-to-learn notions. This book devoted to these topics more than 140 pages. So you can get enough knowledge, I'm convinced. Furthermore, more than 450 exercises will deepen your understanding. Of cource, this book is written for graduate students in mathematics. As the authors say, you can get adequate knowledge if you want to major in Banach space theory.

Modular Forms (Graduate Texts in Mathematics) Introduction to Smooth Manifolds (Graduate Texts in Mathematics, Vol. 218)