Introductory Functional Analysis with Applications

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Provides avenues for applying functional analysis to the practical study of natural sciences as well as mathematics. Contains worked problems on Hilbert space theory and on Banach spaces and emphasizes concepts, principles, methods and major applications of functional analysis.

Introductory Functional Analysis with Applications Details

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From Reader Review Introductory Functional Analysis with Applications for online ebook

Mark says

This was my textbook for a graduate course in functional analysis, and it is called "classic" by many professors. Don't be fooled by the title of the book: "Introductory" simply means the author assumes you have not seen the subject before, and it is by no means an easy subject. However, the exposition is extremely clear. Kreyszig saved me on numerous occasions as my companion on a treacherous journey through graduate functional analysis.

This book does what few math textbooks do, though all of them should do. Rather than assail you with theorem, proof, theorem, proof, Kreyszig first tells you what he is about to show you, then explains the motivation -- i.e., why we need the following theorem. Then, once outlined, properly motivated, and placed in context, he delivers the theorem and its proof. Furthermore, Kreyszig explicitly spells out what other texts might assume you will "read between the lines", explaining why and how we are able to take each step forward during a proof.

The problems in the book are also good. They are at a level such that you can attempt them and solve them on your own, while at the same time they give you the hands-on experience you need in order to gain a deeper understanding of the principles at hand. They serve as a great confidence-builder before you venture onward and attempt harder problems (for example, in other texts or in research).

As a final treat for physicists, the last chapter takes the mathematics you've learned throughout the book and applies it in an introduction to quantum mechanics. My only gripe with this final chapter (and indeed my only -- minor -- complaint for the entire book) is that most of the interesting results of quantum mechanics arise not from the book's exposition, but as problems for the reader to work out. Of course, if you want to learn quantum mechanics, this isn't the book to begin with but rather a very nice mathematical supplement.

I would recommend this book to anyone wanting to learn functional analysis.

Ashutosh Mohapatra says

I have rated this book 5 stars as it is the best introductory book on the subject with proper motivations that I have found in the market. The problem sets start off with basic results but slowly become more and more difficult. I still have not finished the book yet. I needed functional analysis for quantum mechanics and picked this book mainly because the last chapter on unbounded operators includes applications in quantum mechanics. I am very happy with the text till now. I especially liked the motivation for some of the main theorems in functional analysis like the open mapping theorem and the closed graph theorem. The treatment of the spectral theory of compact operators is also very satisfactory for an introduction to the field. Overall, I highly recommend this book for those who have some background in analysis and linear algebra, especially physics students who want to study the mathematical structure of quantum mechanics.

Terran says

This is apparently a classic text on functional analysis. While it is not perfect, I do find it to be the best thing I've read on the subject. (Thus the 5 stars -- not that it's ideal, but it's the best I've found in the area.) It's well written and more accessible than most texts at this mathematical level. (For a contrast, see my review of Grace Wahba's Spline Models for Observational Data.)

It was through this book that I first began to appreciate the awesome elegance and power of functional analysis.

Sams Kami says

Kreyszig is a good writer. The book is well organized and has many examples and exercises. But it is not an advanced book in Functional Analysis.
