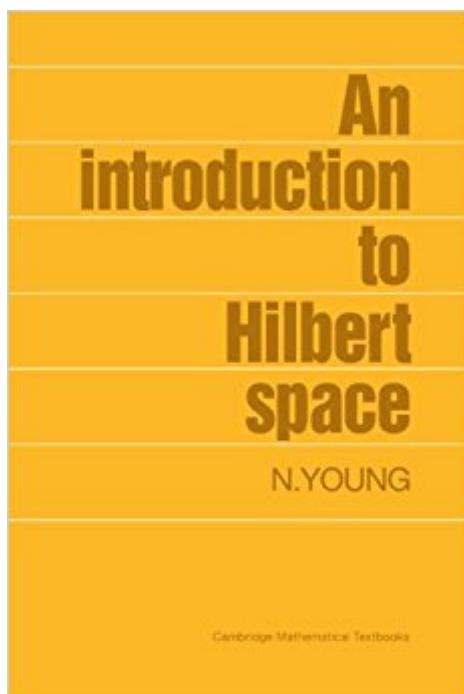


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An Introduction To Hilbert Space (Cambridge Mathematical Textbooks)



Synopsis

This textbook is an introduction to the theory of Hilbert spaces and its applications. The notion of a Hilbert space is a central idea in functional analysis and can be used in numerous branches of pure and applied mathematics. Dr. Young stresses these applications particularly for the solution of partial differential equations in mathematical physics and to the approximation of functions in complex analysis. Some basic familiarity with real analysis, linear algebra and metric spaces is assumed, but otherwise the book is self-contained. The book is based on courses given at the University of Glasgow and contains numerous examples and exercises (many with solutions). The book will make an excellent first course in Hilbert space theory at either undergraduate or graduate level and will also be of interest to electrical engineers and physicists, particularly those involved in control theory and filter design.

Book Information

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Customer Reviews

"...presents a very clear and elegant exposition of the basic notions of the theory of Hilbert space...It is beautiful and relatively recent mathematics..." Mathematical Reviews

The notion of a Hilbert space is a central idea in functional analysis and this text demonstrates its applications in numerous branches of pure and applied mathematics.

This book is good to any control engineer who wants to know the background theory of optimization and robust control, but read an analysis book first.

Young has done an admirable job at presenting some really beautiful and useful aspects of Hilbert spaces in a manner comprehensible for advanced undergraduates. After reading the book and reflecting on the experience, I'm somewhat amazed at the amount of nice ideas that were presented in such a compact text. The book cannot be compared with more rigorous and comprehensive texts such as Rudin, but you still get all the fundamentals of Hilbert space plus some wonderful applications. I must strongly disagree with the reader from Sao Paolo who says that chapters 12 and 13 are poorly motivated. These chapters are crucial for the final theorem of the book in chapter 16. Parrott's Theorem in chapter 12 is the key to the foundational Nehari's theorem of chapter 15. Chapter 13 explores Hardy spaces which are the setting place for the major theorem of Adamyan, Arov, and Krein in chapter 16. In fact, I found the movement of ideas from chapter 12 to chapter 16 to be marvelously compelling. These chapters have extreme importance for theoretically oriented control engineers. Only a modicum of real and complex analysis is necessary to understand the book. Knowledge of measure theory is not required.

The first eleven chapters are an excellent introduction to functional analysis. Both Hilbert and Banach spaces are introduced carefully. Then there are two short chapters on orthogonal expansions and classical Fourier series and then linear operators are studied. From the point of view of a person who is interested in applications to physics and engineering one can say that the book is well motivated mainly because it is so compact and because of the many notes on applications. Chapters nine, ten and eleven on Green's functions and eigenfunctions expansions are extremely good. Chapters twelve and thirteen are poorly motivated from the point of view of applications. Finally chapters fourteen to sixteen try to exhibit the applications to complex analysis of operator theory and be helpful to electrical engineers. I think the book fails in this. So the ten first chapters of the book are excellent. The remaining less so.

This book was the required text for a course on Hilbert Spaces at University of Edinburgh that I took back in 1998. This book is very readable, and does a great job of presenting the material. A great read if you plan to study Hilbert Spaces, Banach Spaces, or other topics in Functional Analysis at an introductory level.

An unusually readable book on Hilbert space. Very clean notation and very detailed proofs. There are also numerous diagrams. There are also answers to selected problems, but no detailed solutions. If you own one book on Hilbert space, or even functional analysis, this should be it. The author takes great pains to illustrate the ideas involved, not just pound out the theorems.

I found this book a concise, well written and accurate introduction to linear algebra. Although some fellow students told me they found it too dry, I had no problem with that.

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