

《应用泛函分析（第1卷）》

图书基本信息

书名：《应用泛函分析（第1卷）》

13位ISBN编号：9787510005442

10位ISBN编号：7510005442

出版时间：2009-10

出版社：世界图书出版公司

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页数：481

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前言

More precisely, by (i), I mean a systematic presentation of the material governed by the desire for mathematical perfection and completeness of the results. In contrast to (i), approach (ii) starts out from the question "What are the most important applications?" and then tries to answer this question as quickly as possible. Here, one walks directly on the main road and does not wander into all the nice and interesting side roads.

The present book is based on the second approach. It is addressed to undergraduate and beginning graduate students of mathematics, physics, and engineering who want to learn how functional analysis elegantly solves mathematical problems that are related to our real world and that have played an important role in the history of mathematics. The reader should sense that the theory is being developed, not simply for its own sake, but for the effective solution of concrete problems.

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内容概要

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The present book is based on the second approach. It is addressed to undergraduate and beginning graduate students of mathematics, physics, and engineering who want to learn how functional analysis elegantly solves mathematical problems that are related to our real world and that have played an important role in the history of mathematics. The reader should sense that the theory is being developed, not simply for its own sake, but for the effective solution of concrete problems.

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章节摘录

I think that time is ripe for such an approach. From a general point of view, functional analysis is based on an assimilation of analysis, geometry, algebra, and topology. The applications to be considered concern the following topics: ordinary differential equations (initial-value problems, boundary-eigen-value problems, and bifurcation); linear and nonlinear integral equations; variational problems, partial differential equations, and Sobolev spaces; optimization (e.g., Chebyshev approximation, control of rockets, game theory, and dual problems); Fourier series and generalized Fourier series; the Fourier transformation, generalized functions (distributions) and the role of the Green function; partial differential equations of mathematical physics (e.g., the Laplace equation, the heat equation, the wave equation, and the Schrödinger equation); time evolution and semigroups; the N-body problem in celestial mechanics; capillary surfaces; minimal surfaces and harmonic maps; superfluids, superconductors, and phase transition (the Landau-Ginzburg model).

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精彩短评

- 1、虽然已经有几本经典的泛函分析专著，但这本对于我这样的非数学系的人来说，可能更合适，就买了本。
- 2、不错，好好读读。
- 3、这是第一卷，还有第二卷！两本都买了！讲的很详实！
- 4、如果能仔细读下来，你将发现这是非常好的泛函分析的书。语言生动，理论详细而系统，例子经典，浅显易懂。所有定理，推论都有证明。特别讲清了泛函分析的概念与古典的数学分析中的联系，因为泛函分析的有些概念就是古典概念的在新的情况下的推广。我是在自己33岁以后才自学泛函分析，但凭这本书，我已经非常喜欢基础数学了！我觉得还有几本书读起来就像是在读经典小说那样引人入胜，爱不释手。比如:黎茨的《泛函分析讲义》，罗伊登的《实分析》等等国外的作品。
- 5、泛函的入门书，很实用的说。

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