

Theory Of Linear Operators In Hilbert Space Dover

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Explore the fundamental theory of linear operators within the elegant and abstract framework of a Hilbert space. This essential Dover publication offers a clear and comprehensive introduction to functional analysis and operator theory, crucial for advanced students and researchers in mathematics, physics, and engineering disciplines.

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Theory of Linear Operators in Hilbert Space

This classic textbook by two mathematicians from the USSR's prestigious Kharkov Mathematics Institute introduces linear operators in Hilbert space, and presents in detail the geometry of Hilbert space and the spectral theory of unitary and self-adjoint operators. It is directed to students at graduate and advanced undergraduate levels, but because of the exceptional clarity of its theoretical presentation and the inclusion of results obtained by Soviet mathematicians, it should prove invaluable for every mathematician and physicist. 1961, 1963 edition.

Theory of Linear Operators in Hilbert Space

One of the classic textbooks in the field, this outstanding work introduces linear operators in Hilbert space, and presents in detail the geometry of Hilbert space and the spectral theory of unitary and self-adjoint operators.

Theory of Linear Operators in Hilbert Space (Dover Books on Mathematics)

Thought-provoking and accessible in approach, this updated and expanded second edition of the Theory of Linear Operators in Hilbert Space (Dover Books on Mathematics) provides a user-friendly introduction to the subject. Taking a clear structural framework, it guides the reader through the subject's core elements. A flowing writing style combines with the use of illustrations and diagrams throughout the text to ensure the reader understands even the most complex of concepts. This succinct and enlightening overview is a required reading for advanced graduate-level students. We hope you find this book useful in shaping your future career. Feel free to send us your enquiries related to our publications to info@risepress.pw Rise Press

Theory of Linear Operators in Hilbert Space

This volume presents a systematic treatment of the theory of unbounded linear operators in normed linear spaces with applications to differential equations. Largely self-contained, it is suitable for advanced undergraduates and graduate students, and it only requires a familiarity with metric spaces and real variable theory. After introducing the elementary theory of normed linear spaces--particularly Hilbert space, which is used throughout the book--the author develops the basic theory of unbounded linear operators with normed linear spaces assumed complete, employing operators assumed closed only when needed. Other topics include strictly singular operators; operators with closed range; perturbation theory, including some of the main theorems that are later applied to ordinary differential operators; and the Dirichlet operator, in which the author outlines the interplay between functional analysis and "hard" classical analysis in the study of elliptic partial differential equations. In addition to its readable style, this book's appeal includes numerous examples and motivations for certain definitions and proofs. Moreover, it employs simple notation, eliminating the need to refer to a list of symbols.

Theory of Linear Operators in Hilbert Space

This second edition of *Elements of Operator Theory* is a concept-driven textbook that includes a significant expansion of the problems and solutions used to illustrate the principles of operator theory. Written in a user-friendly, motivating style intended to avoid the formula-computational approach, fundamental topics are presented in a systematic fashion, i.e., set theory, algebraic structures, topological structures, Banach spaces, and Hilbert spaces, culminating with the Spectral Theorem. Included in this edition: more than 150 examples, with several interesting counterexamples that demonstrate the frontiers of important theorems, as many as 300 fully rigorous proofs, specially tailored to the presentation, 300 problems, many with hints, and an additional 20 pages of problems for the second edition. *This self-contained work is an excellent text for the classroom as well as a self-study resource for researchers.

Theory of Linear Operators in Hilbert Space

The present lectures intend to provide an introduction to the spectral analysis of self-adjoint operators within the framework of Hilbert space theory. The guiding notion in this approach is that of spectral representation. At the same time the notion of function of an operator is emphasized. The formal aspects of these concepts are explained in the first two chapters. Only then is the notion of Hilbert space introduced. The following three chapters concern bounded, completely continuous, and non-bounded operators. Next, simple differential operators are treated as operators in Hilbert space, and the final chapter deals with the perturbation of discrete and continuous spectra. The preparation of the original version of these lecture notes was greatly helped by the assistance of P. Rejto. Various valuable suggestions made by him and by R. Lewis have been incorporated. The present version of the notes contains extensive modifications, in particular in the chapters on bounded and unbounded operators. February, 1973 K.O.F. PREFACE TO THE SECOND PRINTING The second printing (1980) is a basically unchanged reprint in which a number of minor errors were corrected. The author wishes to thank Klaus Schmidt (Lausanne) and John Sylvester (New York) for their lists of errors. v TABLE OF CONTENTS I. Spectral Representation 1 1. Three typical problems 1 12 2. Linear space and functional representation.

Introduction to the Theory of Linear Nonselfadjoint Operators

This classic text, written by two notable mathematicians, constitutes a comprehensive survey of the general theory of linear operations, together with applications to the diverse fields of more classical analysis. Dunford and Schwartz emphasize the significance of the relationships between the abstract theory and its applications. This text has been written for the student as well as for the mathematician—treatment is relatively self-contained. This is a paperback edition of the original work, unabridged, in three volumes.

Theory of Linear Operators in Hilbert Space

A comprehensive graduate textbook that introduces functional analysis with an emphasis on the theory of linear operators and its application to differential equations, integral equations, infinite systems of linear equations, approximation theory, and numerical analysis. As a textbook designed for senior undergraduate and graduate students, it begins with the geometry of Hilbert spaces and proceeds to the theory of linear operators on these spaces including Banach spaces. Presented as a natural continuation of linear algebra, the book provides a firm foundation in operator theory which is an

essential part of mathematical training for students of mathematics, engineering, and other technical sciences.

Theory of Linear Operators in Hilbert Space

Determining the invariant subspaces of any given transformation and writing the transformation as an integral in terms of invariant subspaces is a fundamental problem. This book presents the foundations of the theory of triangular and Jordan representations of bounded linear operators in Hilbert space and solves the problem in the case of completely continuous transformations. The reader is assumed to know the basics of linear operator theory.

Unbounded Linear Operators

This introduction to Hilbert space, bounded self-adjoint operators, the spectrum of an operator, and operators' spectral decomposition is accessible to readers familiar with analysis and analytic geometry. 1969 edition.

The Elements of Operator Theory

This book is a slightly expanded reproduction of the first two chapters (plus Introduction) of my book *Perturbation Theory for Linear Operators*, Grundlehren der mathematischen Wissenschaften 132, Springer 1980. Ever since, or even before, the publication of the latter, there have been suggestions about separating the first two chapters into a single volume. I have now agreed to follow the suggestions, hoping that it will make the book available to a wider audience. Those two chapters were intended from the outset to be a comprehensive presentation of those parts of perturbation theory that can be treated without the topological complications of infinite-dimensional spaces. In fact, many essential and even advanced results in the theory have non-trivial contents in finite-dimensional spaces, although one should not forget that some parts of the theory, such as those pertaining to scattering, are peculiar to infinite dimensions. I hope that this book may also be used as an introduction to linear algebra. I believe that the analytic approach based on a systematic use of complex functions, by way of the resolvent theory, must have a strong appeal to students of analysis or applied mathematics, who are usually familiar with such analytic tools.

Spectral Theory of Operators in Hilbert Space

It isn't that they can't see the solution. It is Approach your problems from the right end that they can't see the problem. and begin with the answers. Then one day, perhaps you will find the final question. G. K. Chesterton. The Scandal of Father 'The Hermit Clad in Crane Feathers' in R. Brown 'The point of a Pin'. van Gulik's The Chinese Maze Murders. Growing specialization and diversification have brought a host of monographs and textbooks on increasingly specialized topics. However, the "tree" of knowledge of mathematics and related fields does not grow only by putting forth new branches. It also happens, quite often in fact, that branches which were thought to be completely disparate are suddenly seen to be related. Further, the kind and level of sophistication of mathematics applied in various sciences has changed drastically in recent years: measure theory is used (non-trivially) in regional and theoretical economics; algebraic geometry interacts with physics; the Minkowsky lemma, coding theory and the structure of water meet one another in packing and covering theory; quantum fields, crystal defects and mathematical programming profit from homotopy theory; Lie algebras are relevant to filtering; and prediction and electrical engineering can use Stein spaces. And in addition to this there are such new emerging subdisciplines as "experimental mathematics"

Linear Operators, Part 2

From the reviews: "[...] An excellent textbook in the theory of linear operators in Banach and Hilbert spaces. It is a thoroughly worthwhile reference work both for graduate students in functional analysis as well as for researchers in perturbation, spectral, and scattering theory. [...] I can recommend it for any mathematician or physicist interested in this field." Zentralblatt MATH

THEORY OF LINEAR OPERATORS IN HILBERT SPACE (TRANSLATED FROM RUSSIAN). VOL. 02

This book offers an essential introduction to the theory of Hilbert space, a fundamental tool for non-relativistic quantum mechanics. Linear, topological, metric, and normed spaces are all addressed

in detail, in a rigorous but reader-friendly fashion. The rationale for providing an introduction to the theory of Hilbert space, rather than a detailed study of Hilbert space theory itself, lies in the strenuous mathematics demands that even the simplest physical cases entail. Graduate courses in physics rarely offer enough time to cover the theory of Hilbert space and operators, as well as distribution theory, with sufficient mathematical rigor. Accordingly, compromises must be found between full rigor and the practical use of the instruments. Based on one of the authors's lectures on functional analysis for graduate students in physics, the book will equip readers to approach Hilbert space and, subsequently, rigged Hilbert space, with a more practical attitude. It also includes a brief introduction to topological groups, and to other mathematical structures akin to Hilbert space. Exercises and solved problems accompany the main text, offering readers opportunities to deepen their understanding. The topics and their presentation have been chosen with the goal of quickly, yet rigorously and effectively, preparing readers for the intricacies of Hilbert space. Consequently, some topics, e.g., the Lebesgue integral, are treated in a somewhat unorthodox manner. The book is ideally suited for use in upper undergraduate and lower graduate courses, both in Physics and in Mathematics.

Basic Classes of Linear Operators

This self-contained work on Hilbert space operators takes a problem-solving approach to the subject, combining theoretical results with a wide variety of exercises that range from the straightforward to the state-of-the-art. Complete solutions to all problems are provided. The text covers the basics of bounded linear operators on a Hilbert space and gradually progresses to more advanced topics in spectral theory and quasireducible operators. Written in a motivating and rigorous style, the work has few prerequisites beyond elementary functional analysis, and will appeal to graduate students and researchers in mathematics, physics, engineering, and related disciplines.

Triangular and Jordan Representations of Linear Operators

This English edition is almost identical to the German original *Lineare Operatoren in Hilbertriiumen*, published by B. G. Teubner, Stuttgart in 1976. A few proofs have been simplified, some additional exercises have been included, and a small number of new results has been added (e.g., Theorem 11.11 and Theorem 11.23). In addition a great number of minor errors has been corrected. Frankfurt, January 1980 J. Weidmann vii Preface to the German edition The purpose of this book is to give an introduction to the theory of linear operators on Hilbert spaces and then to proceed to the interesting applications of differential operators to mathematical physics. Besides the usual introductory courses common to both mathematicians and physicists, only a fundamental knowledge of complex analysis and of ordinary differential equations is assumed. The most important results of Lebesgue integration theory, to the extent that they are used in this book, are compiled with complete proofs in Appendix A. I hope therefore that students from the fourth semester on will be able to read this book without major difficulty. However, it might also be of some interest and use to the teaching and research mathematician or physicist, since among other things it makes easily accessible several new results of the spectral theory of differential operators.

Introduction to Spectral Theory in Hilbert Space

This book teams up the spectral theory of bounded linear operators with von Neumann's theory of unbounded operators to provide a framework for the study of stable methods for the evaluation of unbounded operators. The text presents numerous illustrations of unbounded linear operators that arise in various inverse problems of mathematical physics. It also offers an extensive exposition of background material from the theory of operators on Hilbert space.

A Chapter in the Theory of Linear Operators in Hilbert Space

A treatment of system theory within the context of finite dimensional spaces, this text is appropriate for students with no previous experience of operator theory. The three-part approach, with notes and references for each section, covers linear algebra and finite dimensional systems, operators in Hilbert space, and linear systems in Hilbert space. 1981 edition.

A Short Introduction to Perturbation Theory for Linear Operators

General spectral theory; Riesz operators; Hermitian operators; Prespectral operators; Well-bounded operators.

Spectral Theory of Self-Adjoint Operators in Hilbert Space

This classic work by the late Stefan Banach has been translated into English so as to reach a yet wider audience. It contains the basics of the algebra of operators, concentrating on the study of linear operators, which corresponds to that of the linear forms $a_1x_1 + a_2x_2 + \dots + a_nx_n$ of algebra. The book gathers results concerning linear operators defined in general spaces of a certain kind, principally in Banach spaces, examples of which are: the space of continuous functions, that of the p th-power-summable functions, Hilbert space, etc. The general theorems are interpreted in various mathematical areas, such as group theory, differential equations, integral equations, equations with infinitely many unknowns, functions of a real variable, summation methods and orthogonal series. A new fifty-page section ("Some Aspects of the Present Theory of Banach Spaces") complements this important monograph.

Perturbation Theory for Linear Operators

Determining the invariant subspaces of any given transformation and writing the transformation as an integral in terms of invariant subspaces is a fundamental problem. This book presents the foundations of the theory of triangular and Jordan representations of bounded linear operators in Hilbert space and solves the problem in the case of completely continuous transformations. The reader is assumed to know the basics of linear operator theory.

A Primer on Hilbert Space Theory

This updated and expanded second edition of the Theory of Linear Operators in Hilbert Space provides a user-friendly introduction to the subject. Taking a clear structural framework, it guides the reader through the subject's core elements. A flowing writing style combines with the use of illustrations and diagrams throughout the text to ensure the reader understands even the most complex of concepts. This succinct and enlightening overview is a required reading for all those interested in the subject. We hope you find this book useful in shaping your future career & Business. Feel free to send us your inquiries related to our publications to info@pwpublishers.pw PW Publishers LTD Berlin Germany

Hilbert Space Operators

Aimed toward researchers, postgraduate students, and scientists in linear operator theory and mathematical inequalities, this self-contained monograph focuses on numerical radius inequalities for bounded linear operators on complex Hilbert spaces for the case of one and two operators. Students at the graduate level will learn some essentials that may be useful for reference in courses in functional analysis, operator theory, differential equations, and quantum computation, to name several. Chapter 1 presents fundamental facts about the numerical range and the numerical radius of bounded linear operators in Hilbert spaces. Chapter 2 illustrates recent results obtained concerning numerical radius and norm inequalities for one operator on a complex Hilbert space, as well as some special vector inequalities in inner product spaces due to Buzano, Goldstein, Ryff and Clarke as well as some reverse Schwarz inequalities and Grüss type inequalities obtained by the author. Chapter 3 presents recent results regarding the norms and the numerical radii of two bounded linear operators. The techniques shown in this chapter are elementary but elegant and may be accessible to undergraduate students with a working knowledge of operator theory. A number of vector inequalities in inner product spaces as well as inequalities for means of nonnegative real numbers are also employed in this chapter. All the results presented are completely proved and the original references are mentioned.

Linear Operators in Hilbert Spaces

Develops the spectral theory of an n th order non-self-adjoint two-point differential operator L in the complex Hilbert space $L_2[0,1]$. The differential operator L is determined by an n th order formal differential I and by n linearly independent boundary values $B_1, \dots, B_n$. Locker first lays the foundations of the spectral theory for closed linear operators and Fredholm operators in Hilbert spaces before developing the spectral theory of the differential operator L . The book is a sequel to Functional analysis and two-point differential operators, 1986. Annotation copyrighted by Book News, Inc., Portland, OR.

Stable Approximate Evaluation of Unbounded Operators

Numerous worked examples and exercises highlight this unified treatment. Simple explanations of difficult subjects make it accessible to undergraduates as well as an ideal self-study guide. 1990 edition.

Linear Systems and Operators in Hilbert Space

This wide ranging but self-contained account of the spectral theory of non-self-adjoint linear operators is ideal for postgraduate students and researchers, and contains many illustrative examples and exercises. Fredholm theory, Hilbert-Schmidt and trace class operators are discussed, as are one-parameter semigroups and perturbations of their generators. Two chapters are devoted to using these tools to analyze Markov semigroups. The text also provides a thorough account of the new theory of pseudospectra, and presents the recent analysis by the author and Barry Simon of the form of the pseudospectra at the boundary of the numerical range. This was a key ingredient in the determination of properties of the zeros of certain orthogonal polynomials on the unit circle. Finally, two methods, both very recent, for obtaining bounds on the eigenvalues of non-self-adjoint Schrodinger operators are described. The text concludes with a description of the surprising spectral properties of the non-self-adjoint harmonic oscillator.

Spectral Theory of Linear Operators

This book is a unique introduction to the theory of linear operators on Hilbert space. The authors' goal is to present the basic facts of functional analysis in a form suitable for engineers, scientists, and applied mathematicians. Although the Definition-Theorem-Proof format of mathematics is used, careful attention is given to motivation of the material covered and many illustrative examples are presented. First published in 1971, Linear Operator in Engineering and Sciences has since proved to be a popular and very useful textbook.

Theory of Linear Operations

Suitable for advanced undergraduates and graduate students, this compact treatment examines linear space, functionals, and operators; diagonalizing operators; operator algebras; and equations of motion. 1969 edition.

Linear Operators: General theory

This classic text, written by two notable mathematicians, constitutes a comprehensive survey of the general theory of linear operations, together with applications to the diverse fields of more classical analysis. Dunford and Schwartz emphasize the significance of the relationships between the abstract theory and its applications. This text has been written for the student as well as for the mathematician—treatment is relatively self-contained. This is a paperback edition of the original work, unabridged, in three volumes.

Triangular and Jordan Representations of Linear Operators

Theory of Linear Operators in Hilbert Space