Linear Operator Theory In Engineering And Science

Operator Theory in Function SpacesThe Elements of Operator TheoryA Course in Operator TheoryOperator Theory in Inner Product SpacesIntroduction to Operator Theory in Riesz SpacesContributions to Operator Theory in Spaces with an Indefinite MetricTheory of Operator Algebras IOperator Theory in Different Settings and Related ApplicationsIntroduction to Operator Theory IOperator Theory and Arithmetic in H [infinity]Lectures on Operator TheoryHardy Classes and Operator TheoryRecent Advances in Operator Theory in Hilbert and Krein SpacesTopics in Operator TheoryOperator Theory, Systems Theory and Scattering Theory: Multidimensional GeneralizationsOperator Theory in Harmonic and Non-commutative AnalysisApplications of Functional Analysis and Operator TheoryElementary Operator TheoryOperator Algebras, Operator Theory and ApplicationsElements of Operator Theory Kehe Zhu Carlos S. Kubrusly John B. Conway Karl-Heinz Förster Adriaan C. Zaanen Aad Dijksma Masamichi Takesaki Roland Duduchava A. Brown Hari Bercovici B. V. Rajarama Bhat Marvin Rosenblum Jussi Behrndt Ernst Hellinger Daniel Alpay Joseph A. Ball V. Hutson Marat V. Markin Maria Amélia Bastos Carlos S. Kubrusly

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Takesaki Roland Duduchava A. Brown Hari Bercovici B. V. Rajarama Bhat Marvin Rosenblum Jussi Behrndt Ernst Hellinger Daniel Alpay Joseph A. Ball V. Hutson Marat V. Markin Maria Amélia Bastos Carlos S. Kubrusly

this book covers toeplitz operators hankel operators and composition operators on both the bergman space and the hardy space the setting is the unit disk and the main emphasis is on size estimates of these operators boundedness compactness and membership in the schatten classes most results concern the relationship between operator theoretic properties of these operators and function theoretic properties of the inducing symbols thus a good portion of the book is devoted to the study of analytic function spaces such as the bloch space besov spaces and bmoa whose elements are to be used as symbols to induce the operators we study the book is intended for both research mathematicians and graduate students in complex analysis and operator theory the prerequisites are minimal a graduate course in each of real analysis complex analysis and functional analysis should sufficiently prepare the reader for the book exercises and bibliographical notes are provided at the end of each chapter these notes will point the reader to additional results and problems kehe zhu is a professor of mathematics at the state university of new york at albany his previous books include theory of bergman spaces springer 2000 with h hedenmalm and b korenblum and spaces of holomorphic functions in the unit ball springer 2005 his current research interests are holomorphic function spaces and operators acting on them

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

operator theory is a significant part of many important areas of modern mathematics functional analysis differential equations index theory representation theory mathematical physics and more this text covers the central themes of operator theory presented with the excellent clarity and style that readers have come to associate with conway s writing early chapters introduce and review material on c algebras normal operators compact operators and non normal operators some of the major topics covered are the spectral theorem the functional calculus and the fredholm index in addition some deep connections between operator theory and analytic functions are presented later chapters cover more advanced topics such as representations of c algebras compact perturbations and von neumann algebras major results such as the sz nagy dilation theorem the weyl von neumann berg theorem and the classification of von neumann algebras are covered as is a treatment of fredholm theory the last chapter gives an introduction to reflexive subspaces which along with hyperreflexive spaces are one of the more successful episodes in the modern study of asymmetric algebras professor conway s authoritative treatment makes this a compelling and rigorous course text suitable for graduate students who have had a standard course in functional analysis

this volume contains contributions written by participants of the 4th workshop on operator theory in krein spaces and applications held at the tu berlin germany december 17 to 19 2004 the workshop covered topics from spectral perturbation and extension theory of linear operators and relations in inner product spaces

since the beginning of the thirties a considerable number of books on func tional analysis has been published among the first ones were those by m h stone on hilbert spaces and by s banach on linear operators both from 1932 the amount of material in the field of functional analysis in cluding operator theory has grown to such an extent that it has become impossible now to include all of it in one book this holds even more for text books therefore authors of textbooks usually restrict themselves to normed spaces or even to hilbert space exclusively and linear operators in these spaces in more advanced texts banach algebras and or topological vector spaces are sometimes included it is only rarely however that the notion of order partial order is explicitly mentioned even in more advanced exposi tions although order structures occur in a natural manner in many examples spaces of real continuous functions or spaces of

measurable function this situation is somewhat surprising since there exist important and illuminating results for partially ordered vector spaces in particular for the case that the space is lattice ordered lattice ordered vector spaces are called vector lattices or riesz spaces the first results go back to f riesz 1929 and 1936 l kan torovitch 1935 and h freudenthal 1936

this volume is dedicated to heinz langer a leading expert in spectral analysis and its applications in particular to operators in spaces with an indefinite metric on the occasion of his 60th birthday the book begins with his biography and list of publications it contains a selection of research papers most of which are devoted to spectral analysis of operators or operator pencils with applications to ordinary and partial differential equations other papers deal with time varying systems interpolation and factorization problems and topics from mathematical physics about half of the papers contain further developments in the theory of operators in spaces with an indefinite metric and treat new applications the book is of interest to a wide audience of pure and applied mathematicians

mathematics for infinite dimensional objects is becoming more and more important today both in theory and application rings of operators renamed von neumann algebras by j dixmier were first introduced by j von neumann fifty years ago 1929 in 254 with his grand aim of giving a sound founda tion to mathematical sciences of infinite nature j von neumann and his collaborator f j murray laid down the foundation for this new field of mathematics operator algebras in a series of papers 240 241 242 257 and 259 during the period of the 1930s and early in the 1940s in the introduction to this series of investigations they stated their solution 1 to the problems of understanding rings of operators seems to be essential for the further advance of abstract operator theory in hilbert space under several aspects first the formal calculus with operator rings leads to them second our attempts to generalize the theory of unitary group representations essentially beyond their classical frame have always been blocked by the unsolved questions connected with these problems third various aspects of the quantum mechanical formalism suggest strongly the elucidation of this subject fourth the knowledge obtained in these investigations gives an approach to a class of abstract algebras without a finite basis which seems to differ essentially from all types hitherto investigated since then there has appeared a large volume of literature and a great deal of progress has been achieved by

many mathematicians

this book provides a selection of reports and survey articles on the latest research in the area of single and multivariable operator theory and related fields the latter include singular integral equations ordinary and partial differential equations complex analysis numerical linear algebra and real algebraic geometry all of which were among the topics presented at the 26th international workshop in operator theory and its applications held in tbilisi georgia in the summer of 2015 moreover the volume includes three special commemorative articles one of them is dedicated to the memory of leiba rodman another to murray marshall and a third to boris khvedelidze an outstanding georgian mathematician and one of the founding fathers of the theory of singular integral equations the book will be of interest to a broad range of mathematicians from graduate students to researchers whose primary interests lie in operator theory complex analysis and applications as well as specialists in mathematical physics

this book was written expressly to serve as a textbook for a one or two semester introductory graduate course in functional analysis its soon to be published companion volume operators on hilbert space is in tended to be used as a textbook for a subsequent course in operator theory in writing these books we have naturally been concerned with the level of preparation of the potential reader and roughly speaking we suppose him to be familiar with the approximate equivalent of a one semester course in each of the following areas linear algebra general topology complex analysis and measure theory experience has taught us however that such a sequence of courses inevitably fails to treat certain topics that are important in the study of functional analysis and operator theory for example tensor products are frequently not discussed in a first course in linear algebra likewise for the topics of convergence of nets and the baire category theorem in a course in topology and the connections between measure and topology in a course in measure theory for this reason we have chosen to devote the first ten chapters of this volume entitled part i to topics of a preliminary nature in other words part i summarizes in considerable detail what a student should and eventually must know in order to study functional analysis and operator theory successfully

jordan s classification theorem for linear transformations on a finite dimensional vector space is a natural highlight of the deep relationship between linear algebra and the arithmetical

properties of polynomial rings because the methods and results of finite dimensional linear algebra seldom extend to or have analogs in infinite dimensional operator theory it is therefore remarkable to have a class of operators which has a classification theorem analogous to jordan s classical result and has properties closely related to the arithmetic of the ring h infty of bounded analytic functions in the unit disk c 0 is such a class and is the central object of study in this book a contraction operator belongs to c 0 if and only if the associated functional calculus on h infty has a nontrivial kernel c 0 was discovered by bela sz nagy and ciprian foias in their work on canonical models for contraction operators on hilbert space besides their intrinsic interest and direct applications operators of class c 0 are very helpful in constructing examples and counterexamples in other branches of operator theory in addition c 0 arises in certain problems of control and realization theory in this survey work the author provides a unified and concise presentation of a subject that was covered in many articles the book describes the classification theory of c 0 and relates this class to other subjects such as general dilation theory stochastic realization representations of convolution algebras and fredholm theory this book should be of interest to operator theorists as well as theoretical engineers interested in the applications of operator theory in an effort to make the book as self contained as possible the author gives an introduction to the theory of dilations and functional models for contraction operators prerequisites for this book are a course in functional analysis and an acquaintance with the theory of hardy spaces in the unit disk in addition knowledge of the trace class of operators is necessary in the chapter on weak contractions

this book resulted from the lectures held at the fields institute waterloo on canada leading international experts presented current results on the theory of c algebras and von neumann algebras together with recent work on the classification of c algebras much of the material in the book is appearing here for the first time and is not available elsewhere in the literature

concise treatment focuses on theory of shift operators toeplitz operators and hardy classes of vector and operator valued functions topics include general theory of shift operators on a hilbert space use of lifting theorem to give a unified treatment of interpolation theorems of the pick nevanlinna and loewner types more appendix bibliography 1985 edition

the present book is a memorial volume devoted to peter jonas it displays recent advances in

modern operator theory in hilbert and krein spaces and contains a collection of original research papers written by many well known specialists in this field the papers contain new results for problems close to the area of research of peter jonas spectral and perturbation problems for operators in inner product spaces generalized nevanlinna functions and definitizable functions scattering theory extension theory for symmetric operators fixed points hyperbolic matrix polynomials moment problems indefinite spectral and sturm liouville problems and invariant subspace problems this book is written for researchers and postgraduates interested in functional analysis and differential operators

some 20 papers discuss topics in operator theory and related fields and the life and work of mathematician hellinger 1883 1950 a pioneer of operator theory and modern analysis among the topics are the theory of hankel and toeplitz operators contractions and shifts operators acting in krein spaces and the borders of complex function theory of interest to pure and applied mathematicians and to historians of mathematics no index annotation c 2003 book news inc portland or booknews com

this volume contains a selection of papers from experts in the area on multidimensional operator theory topics considered include the non commutative case function theory in the polydisk hyponormal operators hyperanalytic functions and holomorphic deformations of linear differential equations operator theory systems theory and scattering theory will be of interest to a wide audience of pure and applied mathematicians electrical engineers and theoretical physicists

this book contains the proceedings of the 23rd international workshop on operator theory and its applications iwota 2012 which was held at the university of new south wales sydney australia from 16 july to 20 july 2012 it includes twelve articles presenting both surveys of current research in operator theory and original results

functional analysis is a powerful tool when applied to mathematical problems arising from physical situations the present book provides by careful selection of material a collection of concepts and techniques essential for the modern practitioner emphasis is placed on the solution of equations including nonlinear and partial differential equations the assumed

background is limited to elementary real variable theory and finite dimensional vector spaces provides an ideal transition between introductory math courses and advanced graduate study in applied mathematics the physical sciences or engineering gives the reader a keen understanding of applied functional analysis building progressively from simple background material to the deepest and most significant results introduces each new topic with a clear concise explanation includes numerous examples linking fundamental principles with applications solidifies the reader s understanding with numerous end of chapter problems

the book is intended as a text for a one semester graduate course in operator theory to be taught from scratch not as a sequel to a functional analysis course with the basics of the spectral theory of linear operators taking the center stage the book consists of six chapters and appendix with the material flowing from the fundamentals of abstract spaces metric vector normed vector and inner product the banach fixed point theorem and its applications such as picard s existence and uniqueness theorem through the basics of linear operators two of the three fundamental principles the uniform boundedness principle and the open mapping theorem and its equivalents the inverse mapping and closed graph theorems to the elements of the spectral theory including gelfand s spectral radius theorem and the spectral theorem for compact self adjoint operators and its applications such as the celebrated lyapunov stability theorem conceived as a text to be used in a classroom the book constantly calls for the student s actively mastering the knowledge of the subject matter there are problems at the end of each chapter starting with chapter 2 and totaling at 150 many important statements are given as problems and frequently referred to in the main body there are also 432 exercises throughout the text including chapter 1 and the appendix which require of the student to prove or verify a statement or an example fill in certain details in a proof or provide an intermediate step or a counterexample they are also an inherent part of the material more difficult problems are marked with an asterisk many problems and exercises are supplied with existential hints the book is generous on examples and contains numerous remarks accompanying definitions examples and statements to discuss certain subtleties raise questions on whether the converse assertions are true whenever appropriate or whether the conditions are essential with carefully chosen material proper attention given to applications and plenty of examples problems and exercises this well designed text is ideal for a one semester master s level graduate course in

operator theory with emphasis on spectral theory for students majoring in mathematics physics computer science and engineering contents preface preliminaries metric spaces vector spaces normed vector spaces and banach spaces linear operators elements of spectral theory in a banach space setting elements of spectral theory in a hilbert space setting appendix the axiom of choice and equivalents bibliography index

this book is composed of three survey lecture courses and some twenty invited research papers presented to woat 2006 the international summer school and workshop on operator algebras operator theory and applications held at lisbon in september 2006 the volume reflects recent developments in the area of operator algebras and their interaction with research fields in complex analysis and operator theory the book is aimed at postgraduates and researchers in these fields

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