Fuglede Putnam Theorem For Hyponormal Or Class

This volume contains solicited articles by speakers at the workshop ranging from expository surveys to original research papers, each of which carefully refereed. They all bear witness to the very rich mathematics that is connected with the study of elementary operators, may it be multivariable spectral theory, the invariant subspace problem or tensor products of C*-algebras.
An introductory exposition of the study of operator theory, presenting an interesting and rapid approach to some results which are not normally treated in an introductory source. The volume includes recent results and coverage of the current state of the field.
Spectral analysis of linear operators has always been one of the more active and important fields of operator theory, and of extensive interest to many operator theorists. Its devel opments usually are closely related to certain important problems in contemporary mathematics and physics. In the last 20 years, many new theories and interesting results have been discovered. Now, in this direction, the fields are perhaps wider and deeper than ever. This book is devoted to the study of hyponormal and semi-hyponormal operators. The main results we shall present are those of the author and his collaborators and colleagues, as well as some concerning related topics. To some extent, hyponormal and semi-hyponormal opera tors are "close" to normal ones. Although those two classes of operators contain normal operators as a subclass, what we are interested in are, naturally, nonnormal operators in those classes. With the well-studied normal operators in hand, we cer tainly wish to know the properties of hyponormal and semi-hypo normal operators which resemble those of normal operators. But more important than that, the investigations should be concen trated on the phenomena which only occur in the nonnormal cases.
A new class of (not necessarily bounded) operators related to (mainly infinite) directed trees is introduced and investigated. Operators in question are to be considered as a generalization of classical weighted shifts, on the one hand, and of weighted adjacency operators, on the other; they are called weighted shifts on directed trees. The basic properties of such operators, including closedness, adjoints, polar decomposition and moduli are studied. Circularity and the Fredholmness of weighted shifts on directed trees are discussed. The relationships between domains of a weighted shift on a directed tree and its adjoint are described. Hyponormality, cohyponormality, subnormality and complete hyperexpansivity of such operators are entirely characterized in terms of their weights. Related questions that arose during the study of the topic are solved as well.
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.
From the Preface: "This book was written for the active reader. The first part consists of problems, frequently preceded by definitions and motivation, and sometimes followed by corollaries and historical remarks... The second part, a very short one, consists of hints... The third part, the longest, consists of solutions: proofs, answers, or contructions, depending on the nature of the problem.... This is not an introduction to Hilbert space theory. Some knowledge of that subject is a prerequisite: at the very least, a study of the elements of Hilbert space theory should proceed concurrently with the reading of this book."
The Operator Theory conferences, organized by the Department of Mathematics of INCREST and the University of Timi~oara, are conceived as a means to promote cooperation and exchange of information between specialists in all areas of operator theory. This volume consists of a careful selec£ion of papers contributed by the participants of the 1986 Conference. They reflect most of the topics dealt with by the modern operator theory, including recent advances in dual operator algebras and the fnvariant subspace problem, operators in indefinite metric spaces, hyponormal, quasi triangular and decomposable operators, various problems in C*- and W*-algebras and so on. The research contracts of the Department of Mathematics of INCREST with the National Council for Science and Technology of Romania provided the means for developing the research activity in mathematics; they represent the generous framework of these meetings, too. It is our pleasure to acknowledge the financial support of UNESCO which also contributed to the success of this meeting. We are indebted to Professor Israel Gohberg for including these Proceedings in the OT Series and for valuable advice in the editing process. Birkhiiuser Verlag was very cooperative in publishing this volume. Camelia Minculescu, Iren Nemethi and Rodica Stoenescu dealt with the dif ficult task of typing the whOle manuscript using a Rank Xerox 860 word processor; we thank them for the excellent job they did.
Contains the material formerly published in even-numbered issues of the Bulletin of the American Mathematical Society.
By a Hilbert-space operator we mean a bounded linear transformation be tween separable complex Hilbert spaces. Decompositions and models for Hilbert-space operators have been very active research topics in operator theory over the past three decades. The main motivation behind them is the in variant subspace problem: does every Hilbert-space operator have a nontrivial invariant subspace? This is perhaps the most celebrated open question in op erator theory. Its relevance is easy to explain: normal operators have invariant subspaces (witness: the Spectral Theorem), as well as operators on finite dimensional Hilbert spaces (witness: canonical Jordan form). If one agrees that each of these (i. e. the Spectral Theorem and canonical Jordan form) is important enough an achievement to dismiss any further justification, then the search for nontrivial invariant subspaces is a natural one; and a recalcitrant one at that. Subnormal operators have nontrivial invariant subspaces (extending the normal branch), as well as compact operators (extending the finite-dimensional branch), but the question remains unanswered even for equally simple (i. e. simple to define) particular classes of Hilbert-space operators (examples: hyponormal and quasinilpotent operators). Yet the invariant subspace quest has certainly not been a failure at all, even though far from being settled. The search for nontrivial invariant subspaces has undoubtly yielded a lot of nice results in operator theory, among them, those concerning decompositions and models for Hilbert-space operators. This book contains nine chapters.

This work is a concise introduction to spectral theory of Hilbert space operators. Its emphasis is on recent aspects of theory and detailed proofs, with the primary goal of offering a modern introductory textbook for a first graduate course in the subject. The coverage of topics is thorough, as the book explores various delicate points and hidden features often left untreated. Spectral Theory of Operators on Hilbert Spaces is addressed to an interdisciplinary audience of graduate students in mathematics, statistics, economics, engineering, and physics. It will also be useful to working mathematicians using spectral theory of Hilbert space operators, as well as for scientists wishing to apply spectral theory to their field. ?
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What could be regarded as the beginning of a theory of commutators AB - BA of operators A and B on a Hilbert space, considered as a dis cipline in itself, goes back at least to the two papers of Weyl [3] {1928} and von Neumann [2] {1931} on quantum mechanics and the commuta tion relations occurring there. Here A and B were unbounded self-adjoint operators satisfying the relation AB - BA = iI, in some appropriate sense, and the problem was that of establishing the essential uniqueness of the pair A and B. The study of commutators of bounded operators on a Hilbert space has a more recent origin, which can probably be pinpointed as the paper of Wintner [6] {1947}. An investigation of a few related topics in the subject is the main concern of this brief monograph. The ensuing work considers commuting or "almost" commuting quantities A and B, usually bounded or unbounded operators on a Hilbert space, but occasionally regarded as elements of some normed space. An attempt is made to stress the role of the commutator AB - BA, and to investigate its properties, as well as those of its components A and B when the latter are subject to various restrictions. Some applica tions of the results obtained are made to quantum mechanics, perturba tion theory, Laurent and Toeplitz operators, singular integral trans formations, and Jacobi matrices.
This textbook introduces spectral theory for bounded linear operators by focusing on (i) the spectral theory and functional calculus for normal operators acting on Hilbert spaces; (ii) the Riesz-Dunford functional calculus for Banach-space operators; and (iii) the Fredholm theory in both Banach and Hilbert spaces. Detailed proofs of all theorems are included and presented with precision and clarity, especially for the spectral theorems, allowing students to thoroughly familiarize themselves with all the important concepts. Covering both basic and more advanced material, the five chapters and two appendices of this volume provide a modern treatment on spectral theory. Topics range from spectral results on the Banach algebra of bounded linear operators acting on Banach spaces to functional calculus for Hilbert and Banach-space operators, including Fredholm and multiplicity theories. Supplementary propositions and further notes are included as well, ensuring a wide range of topics in spectral theory are covered. Spectral Theory of Bounded Linear Operators is ideal for graduate students in mathematics, and will also appeal to a wider audience of statisticians, engineers, and physicists. Though it is mostly self-contained, a familiarity with functional analysis, especially operator theory, will be helpful.
In this paper, the authors study matrix functions of bounded type from the viewpoint of describing an interplay between function theory and operator theory. They first establish a criterion on the coprime-ness of two singular inner functions and obtain several properties of the Douglas-Shapiro-Shields factorizations of matrix functions of bounded type. They propose a new notion of tensored-scalar singularity, and then answer questions on Hankel operators with matrix-valued bounded type symbols. They also examine an interpolation problem related to a certain functional equation on matrix functions of bounded type; this can be seen as an extension of the classical Hermite-Fejér Interpolation Problem for matrix rational functions. The authors then extend the H?-functional calculus to an H?¯¯¯¯¯¯¯¯¯¯+H?-functional calculus for the compressions of the shift. Next, the authors consider the subnormality of Toeplitz operators with matrix-valued bounded type symbols and, in particular, the matrix-valued version of Halmos's Problem 5 and then establish a matrix-valued version of Abrahamse's Theorem. They also solve a subnormal Toeplitz completion problem of 2×2 partial block Toeplitz matrices. Further, they establish a characterization of hyponormal Toeplitz pairs with matrix-valued bounded type symbols and then derive rank formulae for the self-commutators of hyponormal Toeplitz pairs.
'In a certain sense, subnormal operators were introduced too soon because the theory of function algebras and rational approximation was also in its infancy and could not be properly used to examine this class of operators. The progress in the theory of subnormal operators that has come about during the last several years grew out of applying the results of rational approximation' - from the Preface.This book is the successor to the author's 1981 book on the same subject. In addition to reflecting the great strides in the development of subnormal operator theory since the first book, the present work is oriented toward rational functions rather than polynomials. Although the book is a research monograph, it has many of the traits of a textbook, including exercises. The book requires background in function theory and functional analysis, but is otherwise fairly self-contained. The first few chapters cover the basics about subnormal operator theory and present a study of analytic functions on the unit disk. Other topics included are: some results on hyponormal operators, an exposition of rational approximation interspersed with applications to operator theory, a study of weak-star rational approximation, a set of results that can be termed structure theorems for subnormal operators, and a proof that analytic bounded point evaluations exist.
This book is for third and fourth year university mathematics students (and Master students) as well as lecturers and tutors in mathematics and anyone who needs the basic facts on Operator Theory (e.g. Quantum Mechanists). The main setting for bounded linear operators here is a Hilbert space. There is, however, a generous part on General Functional Analysis (not too advanced though). There is also a chapter on Unbounded Closed Operators.The book is divided into two parts. The first part contains essential background on all of the covered topics with the sections: True or False Questions, Exercises, Tests and More Exercises. In the second part, readers may find answers and detailed solutions to the True or False Questions, Exercises and Tests.Another virtue of the book is the variety of the topics and the exercises and the way they are tackled. In many cases, the approaches are different from what is known in the literature. Also, some very recent results from research papers are included.
Most books on linear operators are not easy to follow for students and researchers without an extensive background in mathematics. Self-contained and using only matrix theory, Invitation to Linear Operators: From Matricies to Bounded Linear Operators on a Hilbert Space explains in easy-to-follow steps a variety of interesting recent results on linear operators on a Hilbert space. The author first states the important properties of a Hilbert space, then sets out the fundamental properties of bounded linear operators on a Hilbert space. The final section presents some of the more recent developments in bounded linear operators.
Functional Analysis has become one of the main branches in Chinese mathematics. Many outstanding contributions and results

have been achieved over the past sixty years. This authoritative collection is complementary to Western studies in this field, and seeks to summarise and introduce the historical progress of the development of Functional Analysis in China from the 1940s to the present. A broad range of topics is covered, such as nonlinear functional analysis, linear operator theory, theory of operator algebras, applications including the solvability of some partial differential equations, and special spaces that contain Banach spaces and topological vector spaces. Some of these papers have made a significant impact on the mathematical community worldwide. Audience: This volume will be of interest to mathematicians, physicists and engineers at postgraduate level.