1. Record Nr. UNINA9910494553603321

Autore	Jeribi Aref
Titolo	Perturbation theory for linear operators : denseness and bases with applications / / Aref Jeribi
Pubbl/distr/stampa	Singapore : , : Springer, , [2021] ©2021
ISBN	981-16-2528-X
Descrizione fisica	1 online resource (523 pages)
Disciplina	515.7246
Soggetti	Spectral theory (Mathematics) Linear operators Teoria espectral (Matemàtica) Operadors lineals Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Preface -- Introduction -- References -- Contents -- About the Author -- Symbols Description -- 1 Basic Notations and Results -- 1.1 Spaces and Operators -- 1.1.1 Vector and Normed Spaces -- 1.1.2 Operators on Quasi-Banach Spaces -- 1.1.3 Closed and Closable Operators -- 1.1.4 Adjoint Operator -- 1.1.5 Fredholm Operators -- 1.2 Some Notions of Spectral Theory -- 1.2.1 Closed Graph Theorem -- 1.2.2 Resolvent Set and Spectrum -- 1.2.3 Bounded Operators -- 1.2.4 Numerical Range -- 1.3 Inequalities -- 1.4 Closed Operators -- 1.4.1 Closed Operator Perturbations -- 1.4.2 A-Bounded, A-Closed, and A-Closable -- 1.5 Lebesgue-Dominated Convergence Theorem -- 1.6 Compact, Weakly Compact, Strictly Singular ... -- 1.6.1 Compact Operator -- 1.6.2 Weakly Compact Operator -- 1.6.3 Strictly Singular Operator -- 1.6.4 Discrete Operator -- 1.6.5 Ascent and Descent Operators -- 1.6.6 Riesz Operator -- 1.7 A-Compact Operators -- 1.8 Dunford-Pettis Property -- 1.9 The Jeribi Essential Spectrum -- 1.9.1 Definition -- 1.9.2 A Characterization of the Jeribi Essential Spectrum -- 1.10 Jordan Chain for an Operator and Multiplicities -- 1.11 Laurent Series Expansion of the Resolvent -- 1.12 Bases -- 1.12.1 Algebraic

Bases (Hamel Bases) -- 1.12.2 On a Schauder Basis -- 1.13 Normal Operator -- 1.14 Positive Operators -- 1.15 Spectrum of the Sum of Two Operators -- 1.16 Notes and Remarks -- References -- 2 Analysis with Operators -- 2.1 Projections -- 2.1.1 Generalities -- 2.1.2 Orthogonal Projection -- 2.1.3 Spectral Projection -- 2.1.4 Sum of Spectral Projection -- 2.1.5 l2-Decomposition -- 2.2 Spectral Theory of Compact and Discrete Operators -- 2.2.1 Riesz-Schauder Theorem -- 2.2.2 Discrete Operators -- 2.3 Functions -- 2.3.1 Function of Finite Order -- 2.3.2 Function of Sine Type -- 2.3.3 Generating Function in L2(0, T) -- 2.4 Phragmen-Lindelof Theorems.
2.5 Holomorphic Operator Functions -- 2.5.1 Spectrum and Multiplicities -- 2.5.2 Zeros of a Holomorphic Function -- 2.5.3 Determinant of Operator -- 2.6 Semigroup Theory -- 2.6.1 Definitions -- 2.6.2 Example -- 2.7 Concepts of Subordination and Fully Subordination -- 2.7.1 Concepts of Subordination -- 2.7.2 Concepts of Fully Subordination -- 2.8 Notes and Remarks -- References -- 3 Series of Complex Terms -- 3.1 Identity Results -- 3.1.1 Technical Results -- 3.1.2 Proof of Eq. (3.0.1) When (ak)k equiv1 -- 3.1.3 General Case -- 3.2 Duality Bracket -- 3.2.1 Proof of Eq. (3.2.1) When (ak)k equiv1 -- 3.2.2 Proof of Eq. (3.2.1) When (ak)k1 is Any Sequence in mathbbC -- 3.3 Notes and Remarks -- References -- 4 Carleman-Class -- 4.1 Singular Values -- 4.1.1 Singular Values of a Compact Operator -- 4.1.2 Polar Representation of a Bounded Operator -- 4.1.3 The Dimension of an Operator -- 4.1.4 The Schmidt Expansion of a Compact Operator -- 4.1.5 Some Properties of Singular Values -- 4.1.6 Intermediate Ideals Between F(X) and mathcalK(X) -- 4.2 Spectral Theory of Compact Operators -- 4.2.1 Quasi-Nilpotent Operator -- 4.2.2 Entire Function -- 4.3 Generalized Eigenvectors Associated with the Non-zero Eigenvalues -- 4.3.1 Holomorphic Function -- 4.3.2 Norm of the Resolvent -- 4.4 calCp Carleman-Class -- 4.4.1 Definition -- 4.4.2 The Resolvent Representation -- 4.4.3 Some Properties of calCp Carleman-Class -- 4.5 Fredholm Determinant -- 4.6 Notes and Remarks -- References -- 5 The Evolutionary Problem -- 5.1 Semigroups -- 5.1.1 Basic Elementary Properties of Semigroups -- 5.1.2 The Infinitesimal Generator of a Continuous Semigroup -- 5.1.3 Hille-Yosida Theorem -- 5.1.4 The Differentiability of the Semigroup -- 5.2 Fractional Operators -- 5.2.1 Dunford Integral -- 5.2.2 Fractional of Carleman-Class Operators.
5.3 Expansions on Generalized Eigenvectors of Operators in Hilbert Space -- 5.3.1 Hypotheses -- 5.3.2 Basic Properties -- 5.3.3 Representation of the Solutions -- 5.3.4 The Simple Case of an Operator with Nuclear Resolvent -- 5.3.5 The Limit Case of an Operator with an Almost Nuclear Resolvent -- 5.4 Notes and Remarks -- References -- 6 Completeness Criteria of the Space of Generalized Eigenvectors of Non-Self-Adjoint Operators -- 6.1 Keldysh Results -- 6.1.1 In Hilbert Space -- 6.1.2 In Banach Space -- 6.2 Denseness of the Generalized Eigenvectors of a Compact Operator or an Operator with Compact Resolvent -- 6.2.1 Subspace Attached to an Operator with Compact Resolvent -- 6.2.2 Completeness Criteria of the System of Generalized Eigenvectors of an Operator with Compact Resolvent -- 6.2.3 A Density Result of the Space Generated by the Generalized Eigenvectors of a Compact Operator -- 6.3 Completeness of the System of Root Subspaces -- 6.3.1 Riesz Projection -- 6.3.2 Root Subspaces -- 6.3.3 System of Subspaces -- 6.4 Notes and Remarks -- References -- 7 Bases on Hilbert and Banach Spaces -- 7.1 Some Notions on the Bases of a Vector Space -- 7.1.1 On a Schauder Basis -- 7.1.2 The Coefficient Functionals -- 7.2 Orthonormal Bases in Hilbert Space -- 7.3 Examples of Compact Operators -- 7.3.1 Finite-Rank

Operator -- 7.3.2 Hilbert-Schmidt Operator -- 7.4 Equivalent Bases -- 7.4.1 Image of a Basis Under a Topological Isomorphism -- 7.4.2 Definitions -- 7.4.3 Characterization of Equivalent Bases -- 7.4.4 Near Bases -- 7.5 Hilbert Bases -- 7.6 Riesz Bases -- 7.6.1 On Riesz Bases in a Separable Hilbert Space -- 7.6.2 Riesz Basis of Jordan Chains -- 7.6.3 Basis Property of the Exponential Family -- 7.6.4 Hilbert-Schmidt Operators -- 7.6.5 Perturbation of Riesz Bases in a Separable Hilbert Space -- 7.6.6 Riesz Basis of Operator-Valued Functions.
7.6.7 Riesz Basis of Subspaces -- 7.7 mathcalL-Basis in L2(0,T) -- 7.8 Notes and Remarks -- References -- 8 On a Riesz Basis of Finite-Dimensional Invariant Subspaces -- 8.1 Location of the Spectrum -- 8.2 Riesz Basis -- 8.2.1 On a Riesz Basis of Finite-Dimensional Invariant Subspaces -- 8.2.2 A Large Gap in (G) Yields a Gap in (T) -- 8.2.3 Riesz Basis -- 8.2.4 Sum of Multiplicities -- 8.2.5 Spectral Riesz Basis of Subspaces -- 8.2.6 A Riesz Basis Associated to a Block Operator Matrix -- 8.2.7 Gap in the Spectrum Around the Imaginary Axis -- 8.3 The Evolutionary Equation -- 8.3.1 C0-Semigroup -- 8.3.2 Riesz Basis of Subspaces -- 8.3.3 Riesz Basis -- 8.4 Notes and Remarks -- References -- 9 Analytic Operators in Feki-Jeribi-Sfaxi's Sense -- 9.1 Family of Operators Dependent of Several Parameters -- 9.2 Invariance of the Closure -- 9.3 Eigenvalues -- 9.4 Eigenvectors -- 9.5 Notes and Remarks -- References -- 10 On a Schauder and Riesz Bases of Eigenvectors of an Analytic Operator -- 10.1 Completeness of the System of Root Vectors of T() -- 10.1.1 In Banach Space -- 10.1.2 In Hilbert Space -- 10.2 On Riesz Bases in a Separable Hilbert Space -- 10.3 On a Finitely Spectral Riesz Basis of a Family of Non-normal Operators -- 10.3.1 Spectrum of T() -- 10.3.2 Riesz Basis of Subspaces -- 10.4 Riesz Basis in L2(0, T) -- 10.5 Notes and Remarks -- References -- 11 On the Asymptotic Behavior of the Eigenvalues of an Analytic Operator in the Sense of Kato -- 11.1 Perturbation of T0 -- 11.2 Behavior of the Spectrum of Perturbed Operator T() Under a Finite Rank Perturbation -- 11.2.1 Discrete Spectrum -- 11.2.2 Estimate Norm -- 11.2.3 Sum of Multiplicities of All Eigenvalues of T()-Kr -- 11.3 Behavior of the Spectrum of Perturbed Operator T() -- 11.3.1 Argument of the Function D() -- 11.3.2 Sum of Multiplicities of All Eigenvalues of T().
11.4 Notes and Remarks -- References -- 12 On the Basis Property of Root Vectors Related to a Non-self-adjoint Analytic Operator -- 12.1 Completeness of the System of Root Vectors of T() -- 12.2 Basis with Parentheses of Root Vectors of T() -- 12.2.1 Localization of the Spectrum of T() -- 12.2.2 Basis with Parentheses -- 12.3 Notes and Remarks -- References -- 13 Perturbation Method for Sound Radiation by a Vibrating Plate in a Light Fluid -- 13.1 Perturbation Method for Sound Radiation by a Vibrating Plate in a Light Fluid -- 13.1.1 Position of the Problem -- 13.1.2 Open Questions Introduced in ch1313Filippi -- 13.1.3 Spectral Properties of the Operator T0 -- 13.1.4 Spectral Properties of the Resolvent of the Operator T0 -- 13.1.5 Compactness Results -- 13.1.6 Completeness of the System of Root Vectors -- 13.1.7 On a Riesz Basis in L2(-L,L) -- 13.2 Vibrating Plate in a Light Fluid -- 13.2.1 Elementary Results -- 13.2.2 Completeness Results -- 13.2.3 Basis with Parentheses -- 13.3 Notes and Remarks -- References -- 14 Gribov Operator in Bargmann Space -- 14.1 Finite Sum of Gribov Operators on Null Transverse Dimension (n=1) -- 14.2 Infinite Sum of Gribov Operators on Null Transverse Dimension (n=1) -- 14.2.1 Riesz Basis of Subspaces in the Case Where =1 -- 14.2.2 On the Asymptotic Behavior of the Eigenvalue of Gribov Operator in the Case Where =0 -- 14.2.3 Basis with Parentheses of Gribov Operator in the Bargmann Space in the Case Where =0 -- 14.3 Notes and Remarks

-- References -- 15 Applications in Mathematical Physics and Mechanics -- 15.1 Time-Dependent Rectilinear Transport Equation -- 15.1.1 Resolvent and Spectrum of A -- 15.1.2 Distribution of the Eigenvalues of the Operator A -- 15.1.3 Differentiability of the Semigroup Generated by A -- 15.2 Behavior of Resolvent in the Case of the Lame System.
15.2.1 Explicit Expression for the Operator A.