Scattering Theory for Automorphic Functions. (AM-87) (Annals of Mathematics Studies)

Peter D. Lax, Ralph S. Phillips

Scattering Theory For Automorphic Functions

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Scattering Theory For Automorphic Functions:

    Scattering Theory for Automorphic Functions Peter D. Lax,Ralph S. Phillips,1976 The application by Fadeev and Pavlov of the Lax Phillips scattering theory to the automorphic wave equation led Professors Lax and Phillips to reexamine this development within the framework of their theory This volume sets forth the results of that work in the form of new or more straightforward treatments of the spectral theory of the Laplace Beltrami operator over fundamental domains of finite area the meromorphic character over the whole complex plane of the Eisenstein series and the Selberg trace formula CONTENTS 1 Introduction 2 An abstract scattering theory 3 A modified theory for second order equations with an indefinite energy form 4 The Laplace Beltrami operator for the modular group 5 The automorphic wave equation 6 Incoming and outgoing subspaces for the automorphic wave equations 7 The scattering matrix for the automorphic wave equation 8 The general case 9 The Selberg trace formula **Scattering Theory for Automorphic Functions and Its Relation to L-functions** Ioannis N. Petridis,1992 **Scattering Theory for Automorphic Functions. (AM-87), Volume 87** Peter D. Lax,Ralph S. Phillips,2016-03-02 The application by Fadeev and Pavlov of the Lax Phillips scattering theory to the automorphic wave equation led Professors Lax and Phillips to reexamine this development within the framework of their theory This volume sets forth the results of that work in the form of new or more straightforward treatments of the spectral theory of the Laplace Beltrami operator over fundamental domains of finite area the meromorphic character over the whole complex plane of the Eisenstein series and the Selberg trace formula CONTENTS 1 Introduction 2 An abstract scattering theory 3 A modified theory for second order equations with an indefinite energy form 4 The Laplace Beltrami operator for the modular group 5 The automorphic wave equation 6 Incoming and outgoing subspaces for the automorphic wave equations 7 The scattering matrix for the automorphic wave equation 8 The general case 9 The Selberg trace formula **Scattering theory for automorphic functions. Princeton/N.J.: Princeton Univ** Peter D. Lax,Ralph Saul Phillips,1976 **Spectral Theory of Automorphic Functions** A. B. Venkov,1983 **Mathematical Quantum Theory II** Joel S. Feldman,Richard Gerd Froese,Lon M. Rosen,1995 **Automorphic Forms and Related Topics** Samuele Anni,Jay Jorgenson,Lejla Smajlović,Lynne Walling,2019-06-19 This volume contains the proceedings of the Building Bridges 3rd EU US Summer School and Workshop on Automorphic Forms and Related Topics which was held in Sarajevo from July 11 22 2016 The articles summarize material which was presented during the lectures and speed talks during the workshop These articles address various aspects of the theory of automorphic forms and its relations with the theory of L functions the theory of elliptic curves and representation theory In addition to mathematical content the workshop held a panel discussion on diversity and inclusion which was chaired by a social scientist who has contributed to this volume as well This volume is intended for researchers interested in expanding their own areas of focus thus allowing them to build bridges to mathematical questions in other fields Spectral Theory of Infinite-Area Hyperbolic Surfaces David Borthwick,2007-10 By

focusing on the scattering theory of hyperbolic surfaces this work provides an introduction to the geometry of hyperbolic surfaces Aimed at graduate students and researchers it draws on techniques from functional analysis and differential geometry as well as some techniques from algebra and number theory **Differential Equations in Banach Spaces** Angelo Favini,Enrico Obrecht,2006-12-08 **Peter Lax, Mathematician** Reuben Hersh,2014-12-29 This book is a biography of one of the most famous and influential living mathematicians Peter Lax He is virtually unique as a preeminent leader in both pure and applied mathematics fields which are often seen as competing and incompatible Although he has been an academic for all of his adult life his biography is not without drama and tragedy Lax and his family barely escaped to the U S from Budapest before the Holocaust descended He was one of the youngest scientists to work on the Manhattan Project He played a leading role in coping with the infamous kidnapping of the NYU mathematics department s computer in 1970 The list of topics in which Lax made fundamental and long lasting contributions is remarkable scattering theory solitons shock waves and even classical analysis to name a few His work has been honored many times including the Abel Prize in 2005 The book concludes with an account of his most important mathematical contributions made accessible without heavy prerequisites Reuben Hersh has written extensively on mathematics His book with Philip Davis The Mathematical Experience won the National Book Award in science Hersh is emeritus professor of mathematics at the University of New Mexico **Cohomological Theory of Dynamical Zeta Functions** Andreas Juhl,2012-12-06 Dynamical zeta functions are associated to dynamical systems with a countable set of periodic orbits The dynamical zeta functions of the geodesic flow of lo cally symmetric spaces of rank one are known also as the generalized Selberg zeta functions The present book is concerned with these zeta functions from a cohomological point of view Originally the Selberg zeta function appeared in the spectral theory of automorphic forms and were suggested by an analogy between Weil s explicit formula for the Riemann zeta function and Selberg s trace formula 261 The purpose of the cohomological theory is to understand the analytical properties of the zeta functions on the basis of suitable analogs of the Lefschetz fixed point formula in which periodic orbits of the geodesic flow take the place of fixed points This approach is parallel to Weil s idea to analyze the zeta functions of pro jective algebraic varieties over finite fields on the basis of suitable versions of the Lefschetz fixed point formula The Lefschetz formula formalism shows that the divisors of the rational Hassc Wcil zeta functions are determined by the spectra of Frobenius operators on l adic cohomology **An Introduction to the Langlands Program** Joseph Bernstein,Stephen Gelbart,2013-12-11 For the past several decades the theory of automorphic forms has become a major focal point of development in number theory and algebraic geometry with applications in many diverse areas including combinatorics and mathematical physics The twelve chapters of this monograph present a broad user friendly introduction to the Langlands program that is the theory of automorphic forms and its connection with the theory of L functions and other fields of mathematics Covered are a variety of areas in number theory from the classical zeta function up to the Langlands program

The exposition is sytematic with each chapter focusing on a particular topic devoted to special cases of the program and accessible to graduate students and researchers in the field **Functional Analysis** Peter D. Lax,2014-08-28 Includes sections on the spectral resolution and spectral representation of self adjoint operators invariant subspaces strongly continuous one parameter semigroups the index of operators the trace formula of Lidskii the Fredholm determinant and more Assumes prior knowledge of Naive set theory linear algebra point set topology basic complex variable and real variables Includes an appendix on the Riesz representation theorem <u>The Spectral Theory of Geometrically Periodic Hyperbolic 3-Manifolds</u> Charles L. Epstein,1985 In this paper we develop the spectral theory of the Laplace Beltrami operator for geometrically periodic hyperbolic 3 manifolds double struck capital H3 G Using the theory of holomorphic families of operators we obtain a quantitative description of the absolutely continuous spectrum <u>Selected Papers II</u> Peter D Lax,2005-05-20 A renowned mathematician who considers himself both applied and theoretical in his approach Peter Lax has spent most of his professional career at NYU making significant contributions to both mathematics and computing He has written several important published works and has received numerous honors including the National Medal of Science the Lester R Ford Award the Chauvenet Prize the Semmelweis Medal the Wiener Prize and the Wolf Prize Several students he has mentored have become leaders in their fields Two volumes span the years from 1952 up until 1999 and cover many varying topics from functional analysis partial differential equations and numerical methods to conservation laws integrable systems and scattering theory After each paper or collection of papers is a commentary placing the paper in context and where relevant discussing more recent developments Many of the papers in these volumes have become classics and should be read by any serious student of these topics In terms of insight depth and breadth Lax has few equals The reader of this selecta will quickly appreciate his brilliance as well as his masterful touch Having this collection of papers in one place allows one to follow the evolution of his ideas and mathematical interests and to appreciate how many of these papers initiated topics that developed lives of their own **Regular Extensions of Hermitian Operators** A. V. Kuzhel,S. a. Kuzhel,1998-01-01 The concept of regular extensions of an Hermitian non densely defined operator was introduced by A Kuzhel in 1980 This concept is a natural generalization of proper extensions of symmetric densely defined operators The use of regular extensions enables one to study various classes of extensions of Hermitian operators without using the method of linear relations The central question in this monograph is to what extent the Hermitian part of a linear operator determines its properties Various properties are investigated and some applications of the theory are given Chapter 1 deals with some results from operator theory and the theory of extensions Chapter 2 is devoted to the investigation of regular extensions of Hermitian symmetric operators with certain restrictions In chapter 3 regular extensions of Hermitian operators with the use of boundary value spaces are investigated In the final chapter the results from chapters 1 3 are applied to the investigation of quasi differential operators and models of zero range potential with internal structure **Transmutations, Singular and**

Fractional Differential Equations with Applications to Mathematical Physics Elina Shishkina,Sergei Sitnik,2020-07-24 Transmutations Singular and Fractional Differential Equations with Applications to Mathematical Physics connects difficult problems with similar more simple ones The book s strategy works for differential and integral equations and systems and for many theoretical and applied problems in mathematics mathematical physics probability and statistics applied computer science and numerical methods In addition to being exposed to recent advances readers learn to use transmutation methods not only as practical tools but also as vehicles that deliver theoretical insights Presents the universal transmutation method as the most powerful for solving many problems in mathematics mathematical physics probability and statistics applied computer science and numerical methods Combines mathematical rigor with an illuminating exposition full of historical notes and fascinating details Enables researchers lecturers and students to find material under the single roof <u>Recent Advances in Operator Theory</u> A. Dijksma,Marinus A. Kaashoek,A.C.M. Ran,2012-12-06 This volume contains a selection of papers in modern operator theory and its applications Most of them are directly related to lectures presented at the Inter national Workshop on Operator Theory and its Applications held at the University of Groningen IWOTA 98 in Groningen the Netherlands from June 30 July 3 1998 The workshop was attended by 97 mathematicians of which 12 were PhD or postdoctoral students from 19 countries The program consisted of 19 plenary lectures of 40 minutes and 72 lectures of 30 minutes in 4 parallell sessions The present volume reflects the wide range and rich variety of topics presented and discussed at the workshop The papers deal with operator polynomials and analytic operator functions with spectral problems of partial differential oper ators and related operator matrices with interpolation completion and extension problems with commutant lifting and dilation with Ricatti equations and real ization problems with scattering theory with problems from harmonic analysis and with topics in the theory of reproducing kernel spaces and of spaces with an indefinite metric All papers underwent the usual refereeing process **Floquet Theory for Partial Differential Equations** P.A. Kuchment,2012-12-06 Linear differential equations with periodic coefficients constitute a well developed part of the theory of ordinary differential equations 17 94 156 177 178 272 389 They arise in many physical and technical applications 177 178 272 A new wave of interest in this subject has been stimulated during the last two decades by the development of the inverse scattering method for integration of nonlinear differential equations This has led to significant progress in this traditional area 27 71 72 111 119 250 276 277 284 286 287 312 313 337 349 354 392 393 403 404 At the same time many theoretical and applied problems lead to periodic partial differential equations We can mention for instance quantum mechanics 14 18 40 54 60 91 92 107 123 157 160 192 193 204 315 367 412 414 415 417 hydrodynamics 179 180 elasticity theory 395 the theory of guided waves 87 89 208 300 homogenization theory 29 41 348 direct and inverse scattering 175 206 216 314 388 406 408 parametric resonance theory 122 178 and spectral theory and spectral geometry 103 105 381 382 389 There is a sjgnificant distinction between the cases of ordinary and partial differential periodic equations The main tool of the theory of periodic ordinary

differential equations is the so called Floquet theory 17 94 120 156 177 267 272 389 Its central result is the following theorem sometimes called Floquet Lyapunov theorem 120 267   An Introduction to the Mathematical Structure of Quantum Mechanics F. Strocchi,2008 Arising out of the need for Quantum Mechanics QM to be part of the common education of mathematics students this book formulates the mathematical structure of QM in terms of the C algebra of observables which is argued on the basis of the operational definition of measurements and the duality between states and observables

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