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Government Reports Announcements 1971-10

Asymptotic Theory of Finite Dimensional Normed Spaces Vitali D. Milman 2009-02-27 This book deals with the geometrical structure of finite dimensional normed spaces, as the dimension grows to infinity. This is a part of what came to be known as the Local Theory of Banach Spaces (this name was derived from the fact that in its first stages, this theory dealt mainly with relating the structure of infinite dimensional Banach spaces to the structure of their lattice of finite dimensional subspaces). Our purpose in this book is to introduce the reader to some of the results, problems, and mainly methods developed in the Local Theory, in the last few years. This by no means is a complete survey of this wide area. Some of the main topics we do not discuss here are mentioned in the Notes and Remarks section. Several books appeared recently or are going to appear shortly, which cover much of the material not covered in this book. Among these are Pisier's [Pis6] where factorization theorems related to Grothendieck's theorem are extensively discussed, and Tomczak-Jaegermann's [T-J] where operator ideals and distances between finite dimensional normed spaces are studied in detail. Another related book is Pietch's [Pie].

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.

Fascinating Mathematical People Donald J. Albers 2011-09-06 Top mathematicians talk about their work and lives Fascinating Mathematical People is a collection of informal interviews and memoirs of sixteen prominent members of the mathematical community of the twentieth century, many still active. The candid portraits collected here demonstrate that while these men and women vary widely in terms of their backgrounds, life stories, and worldviews, they all share a deep and abiding sense of wonder about mathematics. Featured here—in their own words—are major research mathematicians whose cutting-edge discoveries have advanced the frontiers of the field, such as Lars Ahlfors, Mary Cartwright, Dusa McDuff, and Atle Selberg. Others are leading mathematicians who have also been highly influential as teachers and mentors, like Tom Apostol and Jean Taylor. Fern Hunt describes what it was like to be among the first black women to earn a PhD in mathematics. Harold Bacon made trips to Alcatraz to help a prisoner learn calculus. Thomas Banchoff, who first became interested in the fourth dimension while reading a Captain Marvel comic, relates his fascinating friendship with Salvador Dalí and their shared passion for art, mathematics, and the profound connection between the two. Other mathematical people found here are Leon Bankoff, who was also a Beverly Hills dentist; Arthur Benjamin, a part-time professional magician; and Joseph Gallian, a legendary mentor of future mathematicians, but also a world-renowned expert on the Beatles. This beautifully illustrated collection includes many photographs never before published, concise introductions by the editors to each person, and a foreword by Philip J. Davis.

Government Reports Announcements & Index 1971

Hypocoercivity Cédric Villani 2009-10-08 This memoir attempts at a systematic study of convergence to stationary state for certain classes of degenerate diffusive equations, taking the general form $\frac{\partial f}{\partial t} + Lf = 0$. The question is whether and how one can overcome the degeneracy by exploiting commutators.

Metric Embeddings Mikhail I. Ostrovskii 2013-06-26 Embeddings of discrete metric spaces into Banach spaces recently became an important tool in computer science and topology. The purpose of the book is to present some of the most important techniques and results, mostly on bilipschitz and coarse embeddings. The topics include: (1) Embeddability of locally finite metric spaces into Banach spaces is finitely determined; (2) Constructions of embeddings; (3) Distortion in terms of Poincaré inequalities; (4) Constructions of families of expanders and of families of graphs with unbounded girth and lower bounds on average degrees; (5) Banach spaces which do not admit coarse embeddings of expanders; (6) Structure of metric spaces which are not coarsely embeddable into a Hilbert space; (7) Applications of Markov chains to embeddability problems; (8) Metric characterizations of properties of Banach spaces; (9) Lipschitz free spaces. Substantial part of the book is devoted to a detailed presentation of relevant results of Banach space theory and graph theory. The final chapter contains a list of open problems. Extensive bibliography is also included. Each chapter, except the open problems chapter, contains exercises and a notes and remarks section containing references, discussion of related results, and suggestions for further reading. The book will help readers to enter and to work in a very rapidly developing area having many important connections with different parts of mathematics and computer science.

Government Reports Index 1971

Geometric Nonlinear Functional Analysis Yoav Benyamini 1998 This book presents a systematic and unified study of geometric nonlinear functional analysis. This area has its classical roots in the beginning of the twentieth century and is now a very active research area, having close connections to geometric measure theory, probability, classical analysis, combinatorics, and Banach space theory. The main theme of the book is the study of uniformly continuous and Lipschitz functions between Banach spaces (e.g., differentiability, stability, approximation, existence of extensions, fixed points, etc.). This study leads naturally also to the classification of Banach spaces and of their important subsets (mainly spheres) in the uniform and Lipschitz categories. Many recent rather deep theorems and delicate examples are included with complete and detailed proofs. Challenging open problems are described and explained, and promising new research directions are indicated.

Fourier Series, Fourier Transform and Their Applications to Mathematical Physics Valery Serov 2018-08-31 This text serves as an introduction to the modern theory of analysis and differential equations with applications in mathematical physics and engineering sciences.

Having outgrown from a series of half-semester courses given at University of Oulu, this book consists of four self-contained parts. The first part, Fourier Series and the Discrete Fourier Transform, is devoted to the classical one-dimensional trigonometric Fourier series with some applications to PDEs and signal processing. The second part, Fourier Transform and Distributions, is concerned with distribution theory of L. Schwartz and its applications to the Schrödinger and magnetic Schrödinger operations. The third part, Operator Theory and Integral Equations, is devoted mostly to the self-adjoint but unbounded operators in Hilbert spaces and their applications to integral equations in such spaces. The fourth and final part, Introduction to Partial Differential Equations, serves as an introduction to modern methods for classical theory of partial differential equations. Complete with nearly 250 exercises throughout, this text is intended for graduate level students and researchers in the mathematical sciences and engineering.

An Invitation to Modern Number Theory Steven J. Miller 2020-08-04 In a manner accessible to beginning undergraduates, An Invitation to Modern Number Theory introduces many of the central problems, conjectures, results, and techniques of the field, such as the Riemann Hypothesis, Roth's Theorem, the Circle Method, and Random Matrix Theory. Showing how experiments are used to test conjectures and prove theorems, the book allows students to do original work on such problems, often using little more than calculus (though there are numerous remarks for those with deeper backgrounds). It shows students what number theory theorems are used for and what led to them and suggests problems for further research. Steven Miller and Ramin Takloo-Bighash introduce the problems and the computational skills required to numerically investigate them, providing background material (from probability to statistics to Fourier analysis) whenever necessary. They guide students through a variety of problems, ranging from basic number theory, cryptography, and Goldbach's Problem, to the algebraic structures of numbers and continued fractions, showing connections between these subjects and encouraging students to study them further. In addition, this is the first undergraduate book to explore Random Matrix Theory, which has recently become a powerful tool for predicting answers in number theory. Providing exercises, references to the background literature, and Web links to previous student research projects, An Invitation to Modern Number Theory can be used to teach a research seminar or a lecture class.

Computer Mathematics 1979

Natural Function Algebras Charles E. Rickart 2012-12-06 The term "function algebra" usually refers to a uniformly closed algebra of complex valued continuous functions on a compact Hausdorff space. Such Banach algebras, which are also called "uniform algebras", have been much studied during the past 15 or 20 years. Since the most important examples of uniform algebras consist of, or are built up from, analytic functions, it is not surprising that most of the work has been dominated by questions of analyticity in one form or another. In fact, the study of these special algebras and their generalizations accounts for the bulk of the research on function algebras. We are concerned here, however, with another facet of the subject based on the observation that very general algebras of continuous functions tend to exhibit certain properties that are strongly reminiscent of analyticity. Although there exist a variety of well-known properties of this kind that could be mentioned, in many ways the most striking is a local maximum modulus principle proved in 1960 by Hugo Rossi [RII]. This result, one of the deepest and most elegant in the theory of function algebras, is an essential tool in the theory as we have developed it here. It holds for an arbitrary Banach algebra of functions defined on the spectrum (maximal ideal space) of the algebra. These are the algebras, along with appropriate generalizations to algebras defined on noncompact spaces, that we call "natural function algebras".

Absolutely Summing Operators Joe Diestel 1995-04-27 This text provides the beginning graduate student with an account of p -summing and related operators.

Banach Spaces for Analysts P. Wojtaszczyk 1996-08 This book is intended to be used with graduate courses in Banach space theory.

The Fixed Point Index and Some Applications Roger D. Nussbaum 1985

Polyfold and Fredholm Theory Helmut Hofer 2021-07-21 This book pioneers a nonlinear Fredholm theory in a general class of spaces called polyfolds. The theory generalizes certain aspects of nonlinear analysis and differential geometry, and combines them with a pinch of category theory to incorporate local symmetries. On the differential geometrical side, the book introduces a large class of 'smooth' spaces and bundles which can have locally varying dimensions (finite or infinite-dimensional). These bundles come with an important class of sections, which display properties reminiscent of classical nonlinear Fredholm theory and allow for implicit function theorems. Within this nonlinear analysis framework, a versatile transversality and perturbation theory is developed to also cover equivariant settings. The theory presented in this book was initiated by the authors between 2007-2010, motivated by nonlinear moduli problems in symplectic geometry. Such problems are usually described locally as nonlinear elliptic systems, and they have to be studied up to a notion of isomorphism. This introduces symmetries, since such a system can be isomorphic to itself in different ways. Bubbling-off phenomena are common and have to be completely understood to produce algebraic invariants. This requires a transversality theory for bubbling-off phenomena in the presence of symmetries. Very often, even in concrete applications, geometric perturbations are not general enough to achieve transversality, and abstract perturbations have to be considered. The theory is already being successfully applied to its intended applications in symplectic geometry, and should find applications to many other areas where partial differential equations, geometry and functional analysis meet. Written by its originators, Polyfold and Fredholm Theory is an authoritative and comprehensive treatise of polyfold theory. It will prove invaluable for researchers studying nonlinear elliptic problems arising in geometric contexts.

Abstracts of Papers Presented to the American Mathematical Society American Mathematical Society 2007

Convex Duality and Financial Mathematics Peter Carr 2018-07-18 This book provides a concise introduction to convex duality in financial mathematics. Convex duality plays an essential role in dealing with financial problems and involves maximizing concave utility functions and minimizing convex risk measures. Recently, convex and generalized convex dualities have shown to be crucial in the process of the dynamic hedging of contingent claims. Common underlying principles and connections between different perspectives are developed; results are illustrated through graphs and explained heuristically. This book can be used as a reference and is aimed toward graduate students, researchers and practitioners in mathematics, finance, economics, and optimization. Topics include: Markowitz portfolio theory, growth portfolio theory, fundamental theorem of asset pricing emphasizing the duality between utility optimization and pricing by martingale measures, risk measures and its dual representation, hedging and super-hedging and its relationship with linear programming duality and the duality relationship in dynamic hedging of contingent claims

Inverse Source Problems Victor Isakov 1990 Inverse problems arise in many areas of mathematical physics, and applications are rapidly expanding to such areas as geophysics, chemistry, medicine, and engineering. The main theme of this book is uniqueness, stability, and existence of solutions of inverse problems for partial differential equations. Focusing primarily on the inverse problem of potential theory and closely related questions such as coefficient identification problems, this book will give readers an understanding of the results of a substantial part of the theory of inverse problems and of some of the new ideas and methods used. The author provides complete proofs of most general uniqueness theorems for the inverse problem of gravimetry, a detailed study of regularity properties (including examples of non-regular domains with regular potentials), counterexamples to uniqueness and uniqueness theorems, and a treatment of the theory of non-stationary problems. In addition, the book deals with the orthogonality method, formulates several important unsolved problems, and

suggests certain technical means appropriate for further study; some numerical methods are also outlined. Requiring a background in the basics of differential equations and function theory, this book is directed at mathematicians specializing in partial differential equations and potential theory, as well as physicists, geophysicists, and engineers.

Classical Banach Spaces II J. Lindenstrauss 2013-12-11

Dissertation Abstracts International 1970

Probability in Banach Spaces Michel Ledoux 2013-03-09 Isoperimetric, measure concentration and random process techniques appear at the basis of the modern understanding of Probability in Banach spaces. Based on these tools, the book presents a complete treatment of the main aspects of Probability in Banach spaces (integrability and limit theorems for vector valued random variables, boundedness and continuity of random processes) and of some of their links to Geometry of Banach spaces (via the type and cotype properties). Its purpose is to present some of the main aspects of this theory, from the foundations to the most important achievements. The main features of the investigation are the systematic use of isoperimetry and concentration of measure and abstract random process techniques (entropy and majorizing measures). Examples of these probabilistic tools and ideas to classical Banach space theory are further developed.

Metric Structures for Riemannian and Non-Riemannian Spaces Mikhail Gromov 2007-06-25 This book is an English translation of the famous "Green Book" by Lafontaine and Pansu (1979). It has been enriched and expanded with new material to reflect recent progress. Additionally, four appendices, by Gromov on Levy's inequality, by Pansu on "quasiconvex" domains, by Katz on systoles of Riemannian manifolds, and by Semmes on overviewing analysis on metric spaces with measures, as well as an extensive bibliography and index round out this unique and beautiful book.

Current Programs 1975

Reflection Positivity Karl-Hermann Neeb 2018-06-28 Reflection Positivity is a central theme at the crossroads of Lie group representations, euclidean and abstract harmonic analysis, constructive quantum field theory, and stochastic processes. This book provides the first presentation of the representation theoretic aspects of Reflection Positivity and discusses its connections to those different fields on a level suitable for doctoral students and researchers in related fields. It starts with a general introduction to the ideas and methods involving reflection positive Hilbert spaces and the Osterwalder-Schrader transform. It then turns to Reflection Positivity in Lie group representations. Already the case of one-dimensional groups is extremely rich. For the real line it connects naturally with Lax-Phillips scattering theory and for the circle group it provides a new perspective on the Kubo-Martin-Schwinger (KMS) condition for states of operator algebras. For Lie groups Reflection Positivity connects unitary representations of a symmetric Lie group with unitary representations of its Cartan dual Lie group. A typical example is the duality between the Euclidean group $E(n)$ and the Poincaré group $P(n)$ of special relativity. It discusses in particular the curved context of the duality between spheres and hyperbolic spaces. Further it presents some new integration techniques for representations of Lie algebras by unbounded operators which are needed for the passage to the dual group. Positive definite functions, kernels and distributions and used throughout as a central tool.

The Parameterization Method for Invariant Manifolds Àlex Haro 2016-04-18 This monograph presents some theoretical and computational aspects of the parameterization method for invariant manifolds, focusing on the following contexts: invariant manifolds associated with fixed points, invariant tori in quasi-periodically forced systems, invariant tori in Hamiltonian systems and normally hyperbolic invariant manifolds. This book provides algorithms of computation and some practical details of their implementation. The methodology is illustrated with 12 detailed examples, many of them well known in the literature of numerical computation in dynamical systems. A public version of the software used for some of the examples is available online. The book is aimed at mathematicians, scientists and engineers interested in the theory and applications of computational dynamical systems.

Geometry of Cuts and Metrics Michel Marie Deza 2009-11-12 Cuts and metrics are well-known objects that arise - independently, but with many deep and fascinating connections - in diverse fields: in graph theory, combinatorial optimization, geometry of numbers, combinatorial matrix theory, statistical physics, VLSI design etc. This book presents a wealth of results, from different mathematical disciplines, in a unified comprehensive manner, and establishes new and old links, which cannot be found elsewhere. It provides a unique and invaluable source for researchers and graduate students. From the Reviews: "This book is definitely a milestone in the literature of integer programming and combinatorial optimization. It draws from the Interdisciplinarity of these fields [...]. With knowledge about the relevant terms, one can enjoy special subsections without being entirely familiar with the rest of the chapter. This makes it not only an interesting research book but even a dictionary. [...] The longer one works with it, the more beautiful it becomes." Optima 56, 1997.

A Journey Through Discrete Mathematics Martin Loeb1 2017-10-11 This collection of high-quality articles in the field of combinatorics, geometry, algebraic topology and theoretical computer science is a tribute to Jiří Matoušek, who passed away prematurely in March 2015. It is a collaborative effort by his colleagues and friends, who have paid particular attention to clarity of exposition – something Jirka would have approved of. The original research articles, surveys and expository articles, written by leading experts in their respective fields, map Jiří Matoušek's numerous areas of mathematical interest.

Topology, Geometry, and Dynamics: V. A. Rokhlin-Memorial Anatoly M. Vershik 2021-08-30 Vladimir Abramovich Rokhlin (8/23/1919–12/03/1984) was one of the leading Russian mathematicians of the second part of the twentieth century. His main achievements were in algebraic topology, real algebraic geometry, and ergodic theory. The volume contains the proceedings of the Conference on Topology, Geometry, and Dynamics: V. A. Rokhlin-100, held from August 19–23, 2019, at The Euler International Mathematics Institute and the Steklov Institute of Mathematics, St. Petersburg, Russia. The articles deal with topology of manifolds, theory of cobordisms, knot theory, geometry of real algebraic manifolds and dynamical systems and related topics. The book also contains Rokhlin's biography supplemented with copies of actual very interesting documents.

Index to Scientific & Technical Proceedings 1980 Monthly, with annual cumulation. Published conference literature useful both as current awareness and retrospective tools that allow searching by authors of individual papers as well as by editors. Includes proceedings in all formats, i.e., books, reports, journal issues, etc. Complete bibliographical information for each conference proceedings appears in section titled Contents of proceedings, with accompanying category, permuted subject, sponsor, author/editor, meeting location, and corporate indexes. Contains abbreviations used in organizational and geographical names.

Factorization of Linear Operators and Geometry of Banach Spaces Gilles Pisier 1986 This book surveys the considerable progress made in Banach space theory as a result of Grothendieck's fundamental paper "Resume De la Theorie Metrique des Produits Tensoriels Topologiques". The author examines the central question of which Banach spaces X and Y have the property that every bounded operator from X to Y factors through a Hilbert space, in particular when the operators are defined on a Banach lattice, a C^* -algebra or the disc algebra and H^∞ . He reviews the six problems posed at the end of Grothendieck's paper, which have now all been solved (except perhaps the exact value of Grothendieck's constant), and includes the various results which led to their solution. The last chapter contains the author's construction of several Banach spaces such that the injective and projective tensor products coincide; this gives a

negative solution to Grothendieck's sixth problem. Although the book is aimed at mathematicians working in functional analysis, harmonic analysis and operator algebras, its detailed and self-contained treatment makes the material accessible to nonspecialists with a grounding in basic functional analysis. In fact, the author is particularly concerned to develop very recent results in the geometry of Banach spaces in a form that emphasizes how they may be applied in other fields, such as harmonic analysis and C^* -algebras.

The Survival of a Mathematician Steven George Krantz 2009-01 "One of the themes of the book is how to have a fulfilling professional life. In order to achieve this goal, Krantz discusses keeping a vigorous scholarly program going and finding new challenges, as well as dealing with the everyday tasks of research, teaching, and administration." "In short, this is a survival manual for the professional mathematician - both in academics and in industry and government agencies. It is a sequel to the author's *A Mathematician's Survival Guide*."--BOOK JACKET.

Four-Manifold Theory CAMERON AUTOR GORDON 1984 These are the proceedings of the Summer Research Conference on 4-manifolds held at Durham, New Hampshire, July 1982, under the auspices of the American Mathematical Society and National Science Foundation. The conference was highlighted by the breakthroughs of Michael Freedman and S. K. Donaldson and by Frank Quinn's completion at the conference of the proof of the annulus conjecture. (We commend the AMS committee, particularly Julius Shaneson, who had the foresight in Spring 1981 to choose the subject, 4-manifolds, in which such remarkable activity was imminent.) Freedman and several others spoke on his work; some of their talks are represented by papers in this volume. Donaldson and Clifford H. Taubes gave surveys of their work on gauge theory and 4-manifolds and their papers are also included herein. There were a variety of other lectures, including Quinn's surprise, and a couple of problem sessions which led to the problem list. A background of basic differential topology is adequate for potential readers.

A Qualitative Approach to Inverse Scattering Theory Fioralba Cakoni 2013-10-28 Inverse scattering theory is an important area of applied mathematics due to its central role in such areas as medical imaging, nondestructive testing and geophysical exploration. Until recently all existing algorithms for solving inverse scattering problems were based on using either a weak scattering assumption or on the use of nonlinear optimization techniques. The limitations of these methods have led in recent years to an alternative approach to the inverse scattering problem which avoids the incorrect model assumptions inherent in the use of weak scattering approximations as well as the strong a priori information needed in order to implement nonlinear optimization techniques. These new methods come under the general title of qualitative methods in inverse scattering theory and seek to determine an approximation to the shape of the scattering object as well as estimates on its material properties without making any weak scattering assumption and using essentially no a priori information on the nature of the scattering object. This book is designed to be an introduction to this new approach in inverse scattering theory focusing on the use of sampling methods and transmission eigenvalues. In order to aid the reader coming from a discipline outside of mathematics we have included background material on functional analysis, Sobolev spaces, the theory of ill posed problems and certain topics in the theory of entire functions of a complex variable. This book is an updated and expanded version of an earlier book by the authors published by Springer titled *Qualitative Methods in Inverse Scattering Theory* Review of Qualitative Methods in Inverse Scattering Theory All in all, the authors do exceptionally well in combining such a wide variety of mathematical material and in presenting it in a well-organized and easy-to-follow fashion. This text certainly complements the growing body of work in inverse scattering and should well suit both new researchers to the field as well as those who could benefit from such a nice codified collection of profitable results combined in one bound volume. SIAM Review, 2006

The Volume of Convex Bodies and Banach Space Geometry Gilles Pisier 1999-05-27 A self-contained presentation of results relating the volume of convex bodies and Banach space geometry.

Functional Analysis Theo Bühler 2018-08-08 It begins in Chapter 1 with an introduction to the necessary foundations, including the Arzelà–Ascoli theorem, elementary Hilbert space theory, and the Baire Category Theorem. Chapter 2 develops the three fundamental principles of functional analysis (uniform boundedness, open mapping theorem, Hahn–Banach theorem) and discusses reflexive spaces and the James space. Chapter 3 introduces the weak and weak topologies and includes the theorems of Banach–Alaoglu, Banach–Dieudonné, Eberlein–Šmuljan, Kreĭn–Milman, as well as an introduction to topological vector spaces and applications to ergodic theory. Chapter 4 is devoted to Fredholm theory. It includes an introduction to the dual operator and to compact operators, and it establishes the closed image theorem. Chapter 5 deals with the spectral theory of bounded linear operators. It introduces complex Banach and Hilbert spaces, the continuous functional calculus for self-adjoint and normal operators, the Gelfand spectrum, spectral measures, cyclic vectors, and the spectral theorem. Chapter 6 introduces unbounded operators and their duals. It establishes the closed image theorem in this setting and extends the functional calculus and spectral measure to unbounded self-adjoint operators on Hilbert spaces. Chapter 7 gives an introduction to strongly continuous semigroups and their infinitesimal generators. It includes foundational results about the dual semigroup and analytic semigroups, an exposition of measurable functions with values in a Banach space, and a discussion of solutions to the inhomogeneous equation and their regularity properties. The appendix establishes the equivalence of the Lemma of Zorn and the Axiom of Choice, and it contains a proof of Tychonoff's theorem. With 10 to 20 elaborate exercises at the end of each chapter, this book can be used as a text for a one-or-two-semester course on functional analysis for beginning graduate students. Prerequisites are first-year analysis and linear algebra, as well as some foundational material from the second-year courses on point set topology, complex analysis in one variable, and measure and integration.

Metric and Differential Geometry Xianzhe Dai 2012-06-01 Metric and Differential Geometry grew out of a similarly named conference held at Chern Institute of Mathematics, Tianjin and Capital Normal University, Beijing. The various contributions to this volume cover a broad range of topics in metric and differential geometry, including metric spaces, Ricci flow, Einstein manifolds, Kähler geometry, index theory, hypoelliptic Laplacian and analytic torsion. It offers the most recent advances as well as surveys the new developments. Contributors: M.T. Anderson J.-M. Bismut X. Chen X. Dai R. Harvey P. Koskela B. Lawson X. Ma R. Melrose W. Müller A. Naor J. Simons C. Sormani D. Sullivan S. Sun G. Tian K. Wildrick W. Zhang

Geometric Aspects of Functional Analysis Bo'az Klartag 2020-06-20 Continuing the theme of the previous volumes, these seminar notes reflect general trends in the study of Geometric Aspects of Functional Analysis, understood in a broad sense. Two classical topics represented are the Concentration of Measure Phenomenon in the Local Theory of Banach Spaces, which has recently had triumphs in Random Matrix Theory, and the Central Limit Theorem, one of the earliest examples of regularity and order in high dimensions. Central to the text is the study of the Poincaré and log-Sobolev functional inequalities, their reverses, and other inequalities, in which a crucial role is often played by convexity assumptions such as Log-Concavity. The concept and properties of Entropy form an important subject, with Bourgain's slicing problem and its variants drawing much attention. Constructions related to Convexity Theory are proposed and revisited, as well as inequalities that go beyond the Brunn–Minkowski theory. One of the major current research directions addressed is the identification of lower-dimensional structures with remarkable properties in rather arbitrary high-dimensional objects. In addition to functional analytic results, connections to Computer Science and to Differential Geometry are also discussed.

Foundations of Chemical Reaction Network Theory Martin Feinberg 2019-01-31 This book provides an authoritative introduction to the

rapidly growing field of chemical reaction network theory. In particular, the book presents deep and surprising theorems that relate the graphical and algebraic structure of a reaction network to qualitative properties of the intricate system of nonlinear differential equations that the network induces. Over the course of three main parts, Feinberg provides a gradual transition from a tutorial on the basics of reaction network theory, to a survey of some of its principal theorems, and, finally, to a discussion of the theory ' s more technical aspects. Written with great clarity, this book will be of value to mathematicians and to mathematically-inclined biologists, chemists, physicists, and engineers who want to contribute to chemical reaction network theory or make use of its powerful results.

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