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STEWART RAMOS

In Honor of Nicolai Reshetikhin BoD –
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The subject of this book is the introduction and application of a new measure for smoothness offunctions. Though we have both previously published some articles in this direction, the results given here are new. Much of the work was done in the summer of 1984 in Edmonton when we consolidated earlier ideas and worked out most of the details of the text. It took another year and a half to improve and polish many of the theorems. We express

our gratitude to Paul Nevai and Richard Varga for their encouragement. We thank NSERC of Canada for its valuable support. We also thank Christine Fischer and Laura Heiland for their careful typing of our manuscript. z. Ditzian V. Totik

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p-adic Numbers American Mathematical Soc.

Knowledge can be modeled and computed using computational mathematical methods, then lead to real world conclusions. The strongly related to that Computational Analysis is a very large area with lots of applications. This monograph includes a great variety of topics of Computational Analysis. We present: probabilistic wavelet approximations, constrained abstract approximation theory, shape preserving weighted approximation, non positive approximations to definite integrals, discrete best approximation, approximation theory of general Picard singular operators including global smoothness preservation property, fractional singular operators. We also deal with non-isotropic general Picard singular multivariate operators and q-Gauss-Weierstrass singular q-integral operators. We talk about quantitative approximations by shift-invariant univariate and multivariate integral operators, nonlinear neural networks approximation, convergence with rates of positive linear operators, quantitative approximation by bounded linear operators, univariate and multivariate quantitative approximation by

stochastic positive linear operators on univariate and multivariate stochastic processes. We further present right fractional calculus and give quantitative fractional Korovkin theory of positive linear operators. We also give analytical inequalities, fractional Opial inequalities, fractional identities and inequalities regarding fractional integrals. We further deal with semi group operator approximation, simultaneous Feller probabilistic approximation. We also present Fuzzy singular operator approximations. We give transfers from real to fuzzy approximation and talk about fuzzy wavelet and fuzzy neural networks approximations, fuzzy fractional calculus and fuzzy Ostrowski inequality. We talk about discrete fractional calculus, nabla discrete fractional calculus and inequalities. We study the q-inequalities, and q-fractional inequalities. We further study time scales: delta and nabla approaches, duality principle and inequalities. We introduce delta and nabla time scales fractional calculus and inequalities. We finally study convergence with rates of approximate solutions to exact solution of multivariate Dirichlet

problem and multivariate heat equation, and discuss the uniqueness of solution of general evolution partial differential equation \ in multivariate time. The exposed results are expected to find applications to: applied and computational mathematics, stochastics, engineering, artificial intelligence, vision, complexity and machine learning. This monograph is suitable for graduate students and researchers.

A Volume Dedicated to Mizan Rahman CRC Press

This text provides the first comprehensive treatment of the discrete fractional calculus. Experienced researchers will find the text useful as a reference for discrete fractional calculus and topics of current interest. Students who are interested in learning about discrete fractional calculus will find this text to provide a useful starting point. Several exercises are offered at the end of each chapter and select answers have been provided at the end of the book. The presentation of the content is designed to give ample flexibility for potential use in a myriad of courses and for independent study. The novel approach taken by the authors

includes a simultaneous treatment of the fractional- and integer-order difference calculus (on a variety of time scales, including both the usual forward and backwards difference operators). The reader will acquire a solid foundation in the classical topics of the discrete calculus while being introduced to exciting recent developments, bringing them to the frontiers of the subject. Most chapters may be covered or omitted, depending upon the background of the student. For example, the text may be used as a primary reference in an introductory course for difference equations which also includes discrete fractional calculus. Chapters 1–2 provide a basic introduction to the delta calculus including fractional calculus on the set of integers. For courses where students already have background in elementary real analysis, Chapters 1–2 may be covered quickly and readers may then skip to Chapters 6–7 which present some basic results in fractional boundary value problems (FBVPs). Chapters 6–7 in conjunction with some of the current literature listed in the Bibliography can provide a basis for a seminar in the current theory of FBVPs. For a two-

semester course, Chapters 1–5 may be covered in depth, providing a very thorough introduction to both the discrete fractional calculus as well as the integer-order calculus.

Intelligent Mathematics: Computational Analysis Springer

Topics in Contemporary Mathematical Analysis and Applications encompasses several contemporary topics in the field of mathematical analysis, their applications, and relevancies in other areas of research and study. The readers will find developments concerning the topics presented to a reasonable extent with various new problems for further study. Each chapter carefully presents the related problems and issues, methods of solutions, and their possible applications or relevancies in other scientific areas. Aims at enriching the understanding of methods, problems, and applications Offers an understanding of research problems by presenting the necessary developments in reasonable details Discusses applications and uses of operator theory, fixed-point theory, inequalities, bi-univalent functions, functional equations, and scalar-objective

programming, and presents various associated problems and ways to solve such problems This book is written for individual researchers, educators, students, and department libraries.

Topics in Contemporary Mathematical Analysis and Applications Springer

This volume contains twenty refereed papers presented at the 4th Seminar on Stochastic Processes, Random Fields and Applications, which took place in Ascona, Switzerland, from May 2002. The seminar focused mainly on stochastic partial differential equations, stochastic models in mathematical physics, and financial engineering. The book will be a valuable resource for researchers in stochastic analysis and professionals interested in stochastic methods in finance and insurance.

Complex Analysis Springer

p -adic numbers are of great theoretical importance in number theory, since they allow the use of the language of analysis to study problems relating to prime numbers and diophantine equations. Further, they offer a realm where one can do things that are very similar to classical analysis, but with results that are quite

unusual. The book should be of use to students interested in number theory, but at the same time offers an interesting example of the many connections between different parts of mathematics. The book strives to be understandable to an undergraduate audience. Very little background has been assumed, and the presentation is leisurely. There are many problems, which should help readers who are working on their own (a large appendix with hints on the problem is included). Most of all, the book should offer undergraduates exposure to some interesting mathematics which is off the beaten track. Those who will later specialize in number theory, algebraic geometry, and related subjects will benefit more directly, but all mathematics students can enjoy the book.

Theory and Applications of Special Functions American Mathematical Soc.

Designed for graduate students, researchers, and engineers in mathematics, optimization, and economics, this self-contained volume presents theory, methods, and applications in mathematical analysis and approximation theory. Specific topics

include: approximation of functions by linear positive operators with applications to computer aided geometric design, numerical analysis, optimization theory, and solutions of differential equations. Recent and significant developments in approximation theory, special functions and q-calculus along with their applications to mathematics, engineering, and social sciences are discussed and analyzed. Each chapter enriches the understanding of current research problems and theories in pure and applied research.

Centro Stefano Franscini, Ascona, May 2002 Springer Nature

This book includes results of the seventh International Conference on Fuzzy Information and Engineering (ICFIE'2014) and the 1st International Conference of Operations Research and Management (ICORM'2014) on November 7-11, 2014 in ZhuHai, China. The book, contains 35 selected high-quality papers, and is divided into five main parts: Part I focuses on "Fuzzy Systems and Its Applications", Part II on "Fuzzy Mathematics and Its Applications", Part III discusses "Fuzzy Information and Computer", Part IV is

devoted to "Operations Research and Management and Its Applications" and Part V includes various other topics. International Conference in Haldia, India Springer Nature

This book discusses recent developments and contemporary research in mathematics, statistics and their applications in computing. All contributing authors are eminent academicians, scientists, researchers and scholars in their respective fields, hailing from around the world. The conference has emerged as a powerful forum, offering researchers a venue to discuss, interact and collaborate and stimulating the advancement of mathematics and its applications in computer science. The book will allow aspiring researchers to update their knowledge of cryptography, algebra, frame theory, optimizations, stochastic processes, compressive sensing, functional analysis, complex variables, etc. Educating future consumers, users, producers, developers and researchers in mathematics and computing is a challenging task and essential to the development of modern society. Hence, mathematics and its applications in

computer science are of vital importance to a broad range of communities, including mathematicians and computing professionals across different educational levels and disciplines.

Global Calculus Springer Science & Business Media

' This book provides an exposition of function field arithmetic with emphasis on recent developments concerning Drinfeld modules, the arithmetic of special values of transcendental functions (such as zeta and gamma functions and their interpolations), diophantine approximation and related interesting open problems. While it covers many topics treated in 'Basic Structures of Function Field Arithmetic' by David Goss, it complements that book with the inclusion of recent developments as well as the treatment of new topics such as diophantine approximation, hypergeometric functions, modular forms, transcendence, automata and solitons. There is also new work on multizeta values and log-algebraicity. The author has included numerous worked-out examples. Many open problems, which can serve as good thesis problems, are discussed. Contents: Number Fields and

Function Fields
Drinfeld Modules
Explicit Class Field Theory
Gauss Sums and Gamma Functions
Zeta Functions
Higher Rank Theory
Higher Dimensions and Geometric Tools
Applications to Gauss Sums, Gamma and Zeta Values
Diophantine Approximation
Transcendence Results
Automata and Algebraicity: Applications
Readership: Graduate students and researchers in algebra, number theory and geometry.
Keywords: Drinfeld Modules; Motives; Gamma; Zeta; Diophantine Approximation; Automata; Transcendence; Multizeta; Solitons; Periods
Reviews: "It is dense with mathematics, but there is also motivation and discussion. The overall feeling is that of a very helpful survey of a very interesting field."
MAA Online Book Review "Thakur's book is a welcome addition to the collection of books on the arithmetic of Drinfel'd modules and objects related to them. Written by an expert in the field, the book's style is generally informal, without compromising rigor. It certainly will be useful to graduate students wishing to pursue research in the

area of function fields, and at the same time it can be used as a reference book. Many of the important results on special values and transcendence are due to Thakur himself, so in many places the reader gets the 'insider's look' on the subject, and sees how the ideas which go into the proofs were gradually developed."
Mathematical Reviews "Thakur's book is a valuable contribution to the theory of arithmetic function fields ... The author has included several interesting examples and discusses many open problems."
Zentralblatt MATH ' **A Comprehensive Treatment of q -Calculus** Cambridge University Press
This book discusses theoretical and applied aspects of Sturm-Liouville theory and its generalization. It introduces and classifies generalized Sturm-Liouville problems in three different spaces: continuous, discrete, and q -discrete spaces, focusing on special functions that are solutions of a regular or singular Sturm-Liouville problem. Further, it describes the conditions under which the usual Sturm-Liouville problems with symmetric solutions can be extended to a larger class, particularly highlighting the

solutions of generalized problems that result in new orthogonal sequences of continuous or discrete functions. Sturm-Liouville theory is central to problems in many areas, such as engineering, mathematics, physics, and biology. This accessibly written book on the topic is a valuable resource for a broad interdisciplinary readership, from novices to experts.

[The Axiomatic Approach](#) Springer Nature
This book discusses recent developments in and the latest research on mathematics, statistics and their applications. All contributing authors are eminent academics, scientists, researchers and scholars in their respective fields, hailing from around the world. The book presents roughly 60 unpublished, high-quality and peer-reviewed research papers that cover a broad range of areas including approximation theory, harmonic analysis, operator theory, fixed-point theory, functional differential equations, dynamical and control systems, complex analysis, special functions, function spaces, summability theory, Fourier and wavelet analysis, and numerical analysis – all of which are topics of great interest to

the research community – while further papers highlight important applications of mathematical analysis in science, engineering and related areas. This conference aims at bringing together experts and young researchers in mathematics from all over the world to discuss the latest advances in mathematical analysis and at promoting the exchange of ideas in various applications of mathematics in engineering, physics and biology. This conference encourages international collaboration and provides young researchers an opportunity to learn about the current state of the research in their respective fields.

Lie Superalgebras and Enveloping Algebras Springer Science & Business Media

The International Conference on Electronics, Information Technology and Intellectualization (ICEITI2014) was dedicated to build a high-level international academic communication forum for international experts and scholars. This first conference of an annual series was held in Pengcheng, Shenzhen, China 16-17 August 2014. Many

prestigious experts

Computational Analysis Springer Science & Business Media

Manifolds, the higher-dimensional analogs of smooth curves and surfaces, are fundamental objects in modern mathematics. Combining aspects of algebra, topology, and analysis, manifolds have also been applied to classical mechanics, general relativity, and quantum field theory. In this streamlined introduction to the subject, the theory of manifolds is presented with the aim of helping the reader achieve a rapid mastery of the essential topics. By the end of the book the reader should be able to compute, at least for simple spaces, one of the most basic topological invariants of a manifold, its de Rham cohomology. Along the way, the reader acquires the knowledge and skills necessary for further study of geometry and topology. The requisite point-set topology is included in an appendix of twenty pages; other appendices review facts from real analysis and linear algebra. Hints and solutions are provided to many of the exercises and problems. This work may be used as the text for a one-semester graduate or

advanced undergraduate course, as well as by students engaged in self-study. Requiring only minimal undergraduate prerequisites, 'Introduction to Manifolds' is also an excellent foundation for Springer's GTM 82, 'Differential Forms in Algebraic Topology'.

Electronics, Information Technology and Intellectualization American Mathematical Soc.

This volume contains the proceedings of the Tenth International Conference on p -adic and Non-Archimedean Analysis, held at Michigan State University in East Lansing, Michigan, on June 30-July 3, 2008. This volume contains a kaleidoscope of papers based on several of the more important talks presented at the meeting. It provides a cutting-edge connection to some of the most important recent developments in the field. Through a combination of survey papers, research articles, and extensive references to earlier work, this volume allows the reader to quickly gain an overview of current activity in the field and become acquainted with many of the recent sub-branches of its development.

George E. Andrews 80 Years of

Combinatory Analysis Springer
This book is devoted to the qualitative theory of functional dynamic equations on time scales, providing an overview of recent developments in the field as well as a foundation to time scales, dynamic systems, and functional dynamic equations. It discusses functional dynamic equations in relation to mathematical physics applications and problems, providing useful tools for investigation for oscillations and nonoscillations of the solutions of functional dynamic equations on time scales. Practice problems are presented throughout the book for use as a graduate-level textbook and as a reference book for specialists of several disciplines, such as mathematics, physics, engineering, and biology.

An Introduction to Semiclassical and Microlocal Analysis BoD – Books on Demand

Lie superalgebras are a natural generalization of Lie algebras, having applications in geometry, number theory, gauge field theory, and string theory. This book develops the theory of Lie superalgebras, their enveloping algebras, and their representations. The book begins

with five chapters on the basic properties of Lie superalgebras, including explicit constructions for all the classical simple Lie superalgebras. Borel subalgebras, which are more subtle in this setting, are studied and described. Contragredient Lie superalgebras are introduced, allowing a unified approach to several results, in particular to the existence of an invariant bilinear form on \mathfrak{g} . The enveloping algebra of a finite dimensional Lie superalgebra is studied as an extension of the enveloping algebra of the even part of the superalgebra. By developing general methods for studying such extensions, important information on the algebraic structure is obtained, particularly with regard to primitive ideals. Fundamental results, such as the Poincaré-Birkhoff-Witt Theorem, are established. Representations of Lie superalgebras provide valuable tools for understanding the algebras themselves, as well as being of primary interest in applications to other fields. Two important classes of representations are the Verma modules and the finite dimensional representations. The fundamental results here include the Jantzen filtration, the Harish-Chandra

homomorphism, the Sapovalov determinant, supersymmetric polynomials, and Schur-Weyl duality. Using these tools, the center can be explicitly described in the general linear and orthosymplectic cases. In an effort to make the presentation as self-contained as possible, some background material is included on Lie theory, ring theory, Hopf algebras, and combinatorics.

Recent Developments in the Solution of Nonlinear Differential Equations CRC Press
Aimed at the community of mathematicians working on ordinary and partial differential equations, difference equations, and functional equations, this book contains selected papers based on the presentations at the International Conference on Differential & Difference Equations and Applications (ICDDEA) 2015, dedicated to the memory of Professor Georg Sell. Contributions include new trends in the field of differential and difference equations, applications of differential and difference equations, as

well as high-level survey results. The main aim of this recurring conference series is to promote, encourage, cooperate, and bring together researchers in the fields of differential & difference equations. All areas of differential and difference equations are represented, with special emphasis on applications.

Mathematical Analysis and its Applications Springer

To date, the theoretical development of q-calculus has rested on a non-uniform basis. Generally, the bulky Gasper-Rahman notation was used, but the published works on q-calculus looked different depending on where and by whom they were written. This confusion of tongues not only complicated the theoretical development but also contributed to q-calculus remaining a neglected mathematical field. This book overcomes these problems by introducing a new and interesting notation for q-calculus based on logarithms. For instance, q-hypergeometric functions are now

visually clear and easy to trace back to their hypergeometric parents. With this new notation it is also easy to see the connection between q-hypergeometric functions and the q-gamma function, something that until now has been overlooked. The book covers many topics on q-calculus, including special functions, combinatorics, and q-difference equations. Apart from a thorough review of the historical development of q-calculus, this book also presents the domains of modern physics for which q-calculus is applicable, such as particle physics and supersymmetry, to name just a few.

Differential and Difference Equations with Applications Springer Science & Business Media

A collection of articles on various aspects of q-series and special functions dedicated to Mizan Rahman. It also includes an article by Askey, Ismail, and Koelink on Rahman's mathematical contributions and how they influenced the recent upsurge in the subject.