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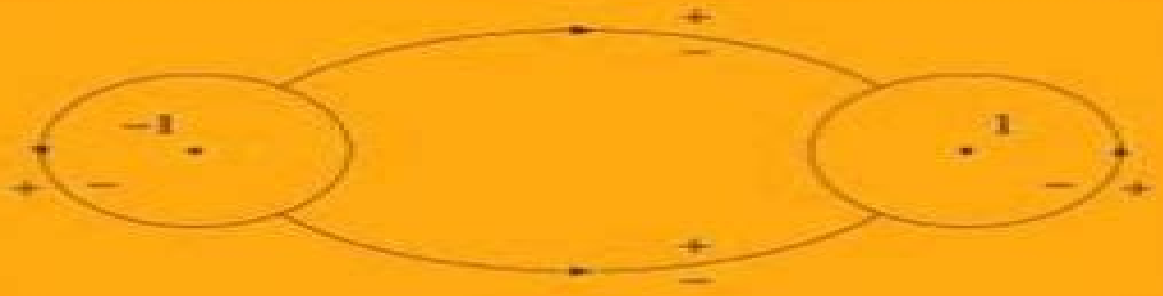
Orthogonal Polynomials and Special Functions

Leuven 2002



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Fred Brauer,Pauline van den Driessche,J. Wu

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Orthogonal Polynomials and Special Functions SPRINGER, **Orthogonal Polynomials and Special Functions** ,2003 **Orthogonal Polynomials and Special Functions** Erik Koelink,Walter Van Assche,2014-01-15 *Séminaire de Probabilités XLII* Catherine Donati-Martin,Michel Émery,Alain Rouault,Christophe Stricker,2009-06-29 The tradition of specialized courses in the S minaires de Probabilit s is continued with A Lejay s Another introduction to rough paths Other topics from this 42nd volume range from the interface between analysis and probability to special processes L vy processes and L vy systems branching penalization representation of Gaussian processes filtrations and quantum probability

Special Functions Refaat El Attar,2005-12-06 Hardcover This book is written to provide an easy to follow study on the subject of Special Functions and Orthogonal Polynomials It is written in such a way that it can be used as a self study text Basic knowledge of calculus and differential equations is needed The book is intended to help students in engineering physics and applied sciences understand various aspects of Special Functions and Orthogonal Polynomials that very often occur in engineering physics mathematics and applied sciences The book is organized in chapters that are in a sense self contained Chapter 1 deals with series solutions of Differential Equations Gamma and Beta functions are studied in Chapter 2 together with other functions that are defined by integrals Legendre Polynomials and Functions are studied in Chapter 3 Chapters 4 and 5 deal with Hermite Laguerre and other Orthogonal Polynomials A detailed treatise of Bessel Function in given in Chapter 6 **Orthogonal Polynomials and Painlevé Equations** Walter Van Assche,2018 There are a number of intriguing connections between Painlev equations and orthogonal polynomials and this book is one of the first to provide an introduction to these Researchers in integrable systems and non linear equations will find the many explicit examples where Painlev equations appear in mathematical analysis very useful Those interested in the asymptotic behavior of orthogonal polynomials will also find the description of Painlev transcendants and their use for local analysis near certain critical points helpful to their work Rational solutions and special function solutions of Painlev equations are worked out in detail with a survey of recent results and an outline of their close relationship with orthogonal polynomials Exercises throughout the book help the reader to get to grips with the material The author is a leading authority on orthogonal polynomials giving this work a unique perspective on Painlev equations **The Dirac Spectrum** Nicolas Ginoux,2009-06-11 This volume surveys the spectral properties of the spin Dirac operator After a brief introduction to spin geometry we present the main known estimates for Dirac eigenvalues on compact manifolds with or without boundaries We give examples where the spectrum can be made explicit and present a chapter dealing with the non compact setting The methods mostly involve elementary analytical techniques and are therefore accessible for Master students entering the subject A complete and updated list of references is also included Layer-Adapted Meshes for Reaction-Convection-Diffusion Problems Torsten Linß,2009-11-21 This is a book on numerical methods for singular perturbation problems in part ular stationary reaction convection diffusion

problems exhibiting layer behaviour More precisely it is devoted to the construction and analysis of layer adapted meshes underlying these numerical methods Numerical methods for singularly perturbed differential equations have been studied since the early 1970s and the research frontier has been constantly panding since A comprehensive exposition of the state of the art in the analysis of numerical methods for singular perturbation problems is 141 which was p lished in 2008 As that monograph covers a big variety of numerical methods it only contains a rather short introduction to layer adapted meshes while the present book is exclusively dedicated to that subject An early important contribution towards the optimisation of numerical methods by means of special meshes was made by N S Bakhvalov 18 in 1969 His paper spawned a lively discussion in the literature with a number of further meshes ing proposed and applied to various singular perturbation problems However in the mid 1980s this development stalled but was enlivened again by G I Shishkin s proposal of piecewise equidistant meshes in the early 1990s 121 150 Because of their very simple structure they are often much easier to analyse than other meshes although they give numerical approximations that are inferior to solutions on c peting meshes Shishkin meshes for numerous problems and numerical methods have been studied since and they are still very much in vogue

Weight Filtrations on Log Crystalline Cohomologies of Families of Open Smooth Varieties Yukiyoshi Nakkajima,Atsushi Shiho,2008-09-15 In this volume the authors construct a theory of weights on the log crystalline cohomologies of families of open smooth varieties in characteristic p 0 by defining and constructing four filtered complexes Fundamental properties of these filtered complexes are proved in particular the p adic purity the functionality of three filtered complexes the weight filtered base change formula the weight filtered K nneth formula the weight filtered Poincar duality and the E2 degeneration of p adic weight spectral sequences In addition the authors state some theorems on the weight filtration and the slope filtration on the rigid cohomology of a separated scheme of finite type over a perfect field of characteristic p 0 **Sobolev Gradients and Differential Equations** john neuberger,2009-11-10 A Sobolev gradient of a real valued functional on a Hilbert space is a gradient of that functional taken relative to an underlying Sobolev norm This book shows how descent methods using such gradients allow a unified treatment of a wide variety of problems in differential equations For discrete versions of partial differential equations corresponding Sobolev gradients are seen to be vastly more efficient than ordinary gradients In fact descent methods with these gradients generally scale linearly with the number of grid points in sharp contrast with the use of ordinary gradients Aside from the first edition of this work this is the only known account of Sobolev gradients in book form Most of the applications in this book have emerged since the first edition was published some twelve years ago What remains of the first edition has been extensively revised There are a number of plots of results from calculations and a sample MatLab code is included for a simple problem Those working through a fair portion of the material have in the past been able to use the theory on their own applications and also gain an appreciation of the possibility of a rather comprehensive point of view on the subject of partial differential equations *Mathematical Modeling in Biomedical*

Imaging I Habib Ammari,2009-10-21 This volume gives an introduction to a fascinating research area to applied mathematicians It is devoted to providing the exposition of promising analytical and numerical techniques for solving challenging biomedical imaging problems which trigger the investigation of interesting issues in various branches of mathematics **Introduction to Complex Reflection Groups and Their Braid Groups** Michel Broué,2010-01-28 This book covers basic properties of complex reflection groups such as characterization Steinberg theorem Gutkin Opdam matrices Solomon theorem and applications including the basic findings of Springer theory on eigenspaces **Vector fields on Singular Varieties** Jean-Paul Brasselet,José Seade,Tatsuo Suwa,2009-11-28 Many authors have questioned the use of the index of the vector field and of the Chern classes if the underlying space becomes singular This book discusses their explorations within the framework of the obstruction theory and the Chern Weil theory **Nonlinear Optimization** Immanuel M. Bomze,Vladimir F. Demyanov,Roger Fletcher,Tamás Terlaky,2010-03-17 This volume collects the expanded notes of four series of lectures given on the occasion of the CIME course on Nonlinear Optimization held in Cetraro Italy from July 1 to 7 2007 The Nonlinear Optimization problem of main concern here is the problem n of determining a vector of decision variables x R that minimizes ma n mizes an objective function f R R when x is restricted to belong n to some feasible setF R usually described by a set of equality and n n m equality constraints F x R h x 0 h R R g x 0 n p g R R of course it is intended that at least one of the functions f h g is nonlinear Although the problem canbe stated in verysimpleterms its solution may result very di cult due to the analytical properties of the functions involved and or to the number n m p of variables and constraints On the other hand the problem has been recognized to be of main relevance in engineering economics and other applied sciences so that a great lot of e ort has been devoted to develop methods and algorithms able to solve the problem even in its more di cult and large instances The lectures have been given by eminent scholars who contributed to a great extent to the development of Nonlinear Optimization theory methods and algorithms Namely they are Professor Immanuel M **In Memoriam Marc Yor - Séminaire de Probabilités XLVII** Catherine Donati-Martin,Antoine Lejay,Alain Rouault,2015-09-07 This volume is dedicated to the memory of Marc Yor who passed away in 2014 The invited contributions by his collaborators and former students bear testament to the value and diversity of his work and of his research focus which covered broad areas of probability theory The volume also provides personal recollections about him and an article on his essential role concerning the Doeblin documents With contributions by P Salminen J Y Yen J Warren T Funaki J Pitman J F Le Gall L Alili P Graczyk K Yano D Bakry A Aksamit T Choulli J Pitman J Obloj P Spoida P Biane J Najnudel P Fitzsimmons Y Le Jan L C G Rogers E Azmoodeh G Peccati P Baldi N Demni A Rouault N O Connell N Ikeda A Comtet P Bougerol L Chaumont L Devroye D Stroock and M Emery **Transseries and Real Differential Algebra** Joris van der Hoeven,2006-10-31 Transseries are formal objects constructed from an infinitely large variable x and the reals using infinite summation exponentiation and logarithm They are suitable for modeling strongly monotonic or tame asymptotic

solutions to differential equations and find their origin in at least three different areas of mathematics analysis model theory and computer algebra They play a crucial role in calle s proof of Dulac s conjecture which is closely related to Hilbert s 16th problem The aim of the present book is to give a detailed and self contained exposition of the theory of transseries in the hope of making it more accessible to non specialists **Mathematical Epidemiology** Fred Brauer,Pauline van den Driessche,J. Wu,2008-04-13 Based on lecture notes of two summer schools with a mixed audience from mathematical sciences epidemiology and public health this volume offers a comprehensive introduction to basic ideas and techniques in modeling infectious diseases for the comparison of strategies to plan for an anticipated epidemic or pandemic and to deal with a disease outbreak in real time It covers detailed case studies for diseases including pandemic influenza West Nile virus and childhood diseases Models for other diseases including Severe Acute Respiratory Syndrome fox rabies and sexually transmitted infections are included as applications Its chapters are coherent and complementary independent units In order to accustom students to look at the current literature and to experience different perspectives no attempt has been made to achieve united writing style or unified notation Notes on some mathematical background calculus matrix algebra differential equations and probability have been prepared and may be downloaded at the web site of the Centre for Disease Modeling www cdm yorku ca *Mathematical Models of Granular Matter* Gianfranco Capriz,Pasquale Giovine,Paolo Maria Mariano,2008-04-20 Granular matter displays a variety of peculiarities that distinguish it from other appearances studied in condensed matter physics and renders its overall mathematical modelling somewhat arduous Prominent directions in the modelling granular flows are analyzed from various points of view Foundational issues numerical schemes and experimental results are discussed The volume furnishes a rather complete overview of the current research trends in the mechanics of granular matter Various chapters introduce the reader to different points of view and related techniques New models describing granular bodies as complex bodies are presented Results on the analysis of the inelastic Boltzmann equations are collected in different chapters Gallavotti Cohen symmetry is also discussed *Mathematical Theory of Feynman Path Integrals* Sergio Albeverio,Rafael Høegh-Krohn,Sonia Mazzucchi,2008-05-06 The 2nd edition of LNM 523 is based on the two first authors mathematical approach of this theory presented in its 1st edition in 1976 An entire new chapter on the current forefront of research has been added Except for this new chapter and the correction of a few misprints the basic material and presentation of the first edition has been maintained At the end of each chapter the reader will also find notes with further bibliographical information **Algebraic Groups and Lie Groups with Few Factors** Alfonso Di Bartolo,Giovanni Falcone,Peter Plaumann,Karl Strambach,2008-04-03 Algebraic groups are treated in this volume from a group theoretical point of view and the obtained results are compared with the analogous issues in the theory of Lie groups The main body of the text is devoted to a classification of algebraic groups and Lie groups having only few subgroups or few factor groups of different type In particular the diversity of the nature of algebraic groups over fields of positive characteristic and over fields

of characteristic zero is emphasized This is revealed by the plethora of three dimensional unipotent algebraic groups over a perfect field of positive characteristic as well as by many concrete examples which cover an area systematically In the final section algebraic groups and Lie groups having many closed normal subgroups are determined

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Table of Contents Orthogonal Polynomials And Special Functions Leuven

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