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Distribution Theory and Transform Analysis A.H. Zemanian 1987-01-01 This well-known text provides a relatively elementary introduction to distribution theory and describes generalized Fourier and Laplace transformations and their applications to integrodifferential equations, difference equations, and passive systems. Suitable for a graduate course for engineering and science students or for an advanced undergraduate course for mathematics majors. 1965 edition.

Applications of Fractional Calculus in Physics R Hilfer 2000-03-02 Fractional calculus is a collection of relatively little-known mathematical results concerning generalizations of differentiation and integration to noninteger orders. While these results have been accumulated over centuries in various branches of mathematics, they have until recently found little appreciation or application in physics and other mathematically oriented sciences. This situation is beginning to change, and there are now a growing number of research areas in physics which employ fractional calculus. This volume provides an introduction to fractional calculus for physicists, and collects easily accessible review articles surveying those areas of physics in which applications of fractional calculus have recently become prominent. Contents:An Introduction to Fractional Calculus (P L Butzer & U Westphal)Fractional Time Evolution (R Hilfer)Fractional Powers of Infinitesimal Generators of Semigroups (U Westphal)Fractional Differences, Derivatives and Fractal Time Series (B J West & P Grigolini)Fractional Kinetics of Hamiltonian Chaotic Systems (G M Zaslavsky)Polymer Science Applications of Path-Integration, Integral Equations, and Fractional Calculus (J F Douglas)Applications to Problems in Polymer Physics and Rheology (H Schiessel et al.)Applications of Fractional Calculus Techniques to Problems in Biophysics (T F Nonnenmacher & R Metzler)Fractional Calculus and Regular Variation in Thermodynamics (R Hilfer) Readership: Statistical, theoretical and mathematical physicists. Keywords:Fractional Calculus in PhysicsReviews: "This monograph provides a systematic treatment of the theory and applications of fractional calculus for physicists. It contains nine review articles surveying those areas in which fractional calculus has become important. All the chapters are self-contained." Mathematics Abstracts

Worked Problems in Applied Mathematics Nikolaĭ Nikolaevich Lebedev 1979

Mathematics of Classical and Quantum Physics Frederick W. Byron 2012-04-26 Graduate-level text offers unified treatment of mathematics applicable to many branches of physics. Theory of vector spaces, analytic function theory, theory of integral equations, group theory, and more. Many problems. Bibliography.

The H-Function A.M. Mathai 2009-10-10 TheH-function or popularly known in the literature as Fox'sH-function has recently found applications in a large variety of problems connected with reaction, diffusion, reaction–diffusion, engineering and communication, fractional differ- tial and integral equations, many areas of theoretical physics, statistical distribution theory, etc. One of the standard books and most cited book on the topic is the 1978 book of Mathai and Saxena. Since then, the subject has grown a lot, mainly in the elds of applications. Due to popular demand, the authors were requested to - grade and bring out a revised edition of the 1978 book. It was decided to bring out a new book, mostly dealing with recent applications in statistical distributions, pa- way models, nonextensive statistical mechanics, astrophysics problems, fractional calculus, etc. and to make use of the expertise of Hans J. Haubold in astrophysics area also. It was decided to con ne the discussion toH-function of one scalar variable only. Matrix variable cases and many variable cases are not discussed in detail, but an insight into these areas is given. When going from one variable to many variables, there is nothing called a unique bivariate or multivariate analogue of a givenfunction. Whatever be the criteria used, there may be manydifferentfunctions quali ed to be bivariate or multivariate analogues of a given univariate function. Some of the bivariate and multivariateH-functions, currently in the literature, are also questioned by many authors.

Introduction to Bessel Functions Frank Bowman 2012-04-27 Self-contained text, useful for classroom or independent study, covers Bessel functions of zero order, modified Bessel functions, definite integrals, asymptotic expansions, and Bessel functions of any real order. 226 problems.

Recent Advances in Orthogonal Polynomials, Special Functions, and Their Applications Jorge Arves 2012-09-11 This volume contains the proceedings of the 11th International Symposium on Orthogonal Polynomials, Special Functions, and their Applications, held August 29-September 2, 2011, at the Universidad Carlos III de Madrid in Leganes, Spain. The papers cover asymptotic properties of polynomials on curves of the complex plane, universality behavior of sequences of orthogonal polynomials for large classes of measures and its application in random matrix theory, the Riemann-Hilbert approach in the study of Pade approximation and asymptotics of orthogonal polynomials, quantum walks and CMV matrices, spectral modifications of linear functionals and their effect on the associated orthogonal polynomials, bivariate orthogonal polynomials, and optimal Riesz and logarithmic energy distribution of points. The methods used include potential theory, boundary values of analytic functions, Riemann-Hilbert analysis, and the steepest descent method.

Special Functions

Special Functions and Orthogonal Polynomials Refaat El Attar 2006-02 (308 Pages). 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.

Differential Equations A. C. King 2003-05-08 Differential equations are vital to science, engineering and mathematics, and this book enables the reader to develop the required skills needed to understand them thoroughly. The authors focus on constructing solutions analytically and interpreting their meaning and use MATLAB extensively to illustrate the material along with many examples based on interesting and unusual real world problems. A large selection of exercises is also provided.

Special Functions for Scientists and Engineers W. W. Bell 2013-07-24 Physics, chemistry, and engineering undergraduates will benefit from this straightforward guide to special functions. Its topics possess wide applications in quantum mechanics, electrical engineering, and many other fields. 1968 edition. Includes 25 figures.

Mathematical Methods for Physics and Engineering K. F. Riley 2006-03-13 The third edition of this highly acclaimed undergraduate textbook is suitable for teaching all the mathematics for an undergraduate course in any of the physical sciences. As well as lucid descriptions of all the topics and many worked examples, it contains over 800 exercises. New stand-alone chapters give a systematic account of the 'special functions' of physical science, cover an extended range of practical applications of complex variables, and give an introduction to quantum operators. Further tabulations, of relevance in statistics and numerical integration, have been added. In this edition, half of the exercises are provided with hints and answers and, in a separate manual available to both students and their teachers, complete worked solutions. The remaining exercises have no hints, answers or worked solutions and can be used for unaided homework; full solutions are available to instructors on a password-protected web site, www.cambridge.org/9780521679718.

Special Functions and Their Applications Nikola? Nikolaevich Lebedev 1972-01-01 The Russian mathematician views the theoretical and practical aspects of special functions and illustrates their significance in problem solving in physics and engineering

Vistas of Special Functions II Kalyan Chakraborty 2010 This book (Vistas II), is a sequel to Vistas of Special Functions (World Scientific, 2007), in which the authors made a unification of several formulas scattered around the relevant literature under the guiding principle of viewing them as manifestations of the functional equations of associated zeta-functions. In Vista II, which maintains the spirit of the theory of special functions through zeta-functions, the authors base their theory on a theorem which gives some arithmetical Fourier series as intermediate modular relations ? avatars of the functional equations. Vista II gives an organic and elucidating presentation of the situations where special functions can be effectively used. Vista II will provide the reader ample opportunity to find suitable formulas and the means to apply them to practical problems for actual research. It can even be used during tutorials for paper writing.

Special Functions George E. Andrews 1999 An overview of special functions, focusing on the hypergeometric functions and the associated hypergeometric series.

Stationary and Related Stochastic Processes Harald Cramér 2013-01-15 This graduate-level text offers a comprehensive account of the general theory of stationary processes and develops the foundations of the general theory of stochastic processes, examines processes with a continuous-time parameter, more. 1967 edition.

A Collection of Problems on Mathematical Physics B. M. Budak 2013-10-22 A Collection of Problems on Mathematical Physics is a translation from the Russian and deals with problems and equations of mathematical physics. The book contains problems and solutions. The book discusses problems on the derivation of equations and boundary condition. These Problems are arranged on the type and reduction to canonical form of equations in two or more independent variables. The equations of hyperbolic type concerns derive from problems on vibrations of continuous media and on electromagnetic oscillations. The book considers the statement and solutions of boundary value problems pertaining to equations of parabolic types when the physical processes are described by functions of two, three or four independent variables such as spatial coordinates or time. The book then discusses dynamic problems pertaining to the mechanics of continuous media and problems on electrodynamics. The text also discusses hyperbolic and elliptic types of equations. The book is intended for students in advanced mathematics and physics, as well as, for engineers and workers in research institutions.

Special Functions of Mathematics for Engineers Larry C. Andrews 1998 Modern engineering and physical science applications demand a thorough knowledge of applied mathematics, particularly special functions. These typically arise in applications such as communication systems, electro-optics, nonlinear wave propagation, electromagnetic theory, electric circuit theory, and quantum mechanics. This text systematically introduces special functions and explores their properties and applications in engineering and science.

Mathematical Handbook for Scientists and Engineers Granino A. Korn 2013-04-26 Convenient access to information from every area of mathematics: Fourier transforms, Z transforms, linear and nonlinear programming, calculus of variations, random-process theory, special functions, combinatorial analysis, game theory, much more.

Special Functions & Their Applications N. N. Lebedev 2012-04-30 Famous Russian work discusses the application of cylinder functions and spherical harmonics; gamma function; probability integral and related functions; Airy functions; hyper-geometric functions; more. Translated by Richard Silverman.

Special Functions for Engineers and Applied Mathematics Larry C. Andrews 1985-01-01

Bessel and Related Functions Refaat El Attar 2007-04 This book is written to provide an easy to follow study on the subject of Bessel and Related Functions. It is also written in 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 Bessel Functions that very often occur in engineering, physics, mathematics and applied sciences.

Integrals and Series: Special functions Anatoliĭ Platonovich Prudnikov 1986

A First Look at Perturbation Theory James G. Simmonds 2013-07-04 This introductory text explains methods for obtaining approximate solutions to mathematical problems by exploiting the presence of small, dimensionless parameters. For engineering and physical science undergraduates.

Hyperbolic Functions V. G. Shervatov 2013-11-07 This single-volume compilation consists of Hyperbolic Functions, introducing the hyperbolic sine, cosine, and tangent; Configuration Theorems, concerning collinear points and concurrent lines; and Equivalent and Equidecomposable Figures, regarding polyhedrons. 1963 edition.

Mathematics for Physicists Philippe Dennery 2012-06-11 Superb text provides math needed to understand today's more advanced topics in physics and engineering. Theory of functions of a complex variable, linear vector spaces, much more. Problems. 1967 edition.

Selected Special Functions for Fundamental Physics Valeriya Akhmedova 2019-11-14 This book presents calculation methods that are used in both mathematical and theoretical physics. These methods will allow readers to work with selected special functions and more generally with differential equations, which are the most frequently used in quantum mechanics, theory of relativity and quantum field theory. The authors explain various approximation methods used to solve differential equations and to estimate integrals. They also address the basics of the relations between differential equations, special functions and representation theory of some of the simplest algebras on the one hand, and fundamental physics on the other. Based on a seminar for graduate physics students, the book offers a compact and quick way to learn about special functions. To gain the most from it, readers should be familiar with the basics of calculus, linear algebra, and complex analysis, as well as the basic methods used to solve differential equations and calculate integrals.

Handbook of Mathematical Functions Milton Abramowitz 1965-01-01 An extensive summary of mathematical functions that occur in physical and engineering problems

Complex Analysis with Applications Richard A. Silverman 1984-01-01 The basics of what every scientist and engineer should know, from complex numbers, limits in the complex plane, and complex functions to Cauchy's theory, power series, and applications of residues. 1974 edition.

Introductory Complex Analysis Richard A. Silverman 2013-04-15 Shorter version of Markushevich's Theory of Functions of a Complex Variable, appropriate for advanced undergraduate and graduate courses in complex analysis. More than 300 problems, some with hints and answers. 1967 edition.

Numerical Methods for Special Functions Amparo Gil 2007-01-01 Special functions arise in many problems of pure and applied mathematics, mathematical statistics, physics, and engineering. This book provides an up-to-date overview of numerical methods for computing special functions and discusses when to use these methods depending on the function and the range of parameters. Not only are standard and simple parameter domains considered, but methods valid for large and complex parameters are described as well. The first part of the book (basic methods) covers convergent and divergent series, Chebyshev expansions, numerical quadrature, and recurrence relations. Its focus is on the computation of special functions; however, it is suitable for general numerical courses. Pseudoalgorithms are given to help students write their own algorithms. In addition to these basic tools, the authors discuss other useful and efficient methods, such as methods for computing zeros of special functions, uniform asymptotic expansions, Padé approximations, and sequence transformations. The book also provides specific algorithms for computing several special functions (like Airy functions and parabolic cylinder functions, among others).

The Gamma Function Emil Artin 2015-01-28 This brief monograph on the gamma function was designed by the author to fill what he perceived as a gap in the literature of mathematics, which often treated the gamma function in a manner he described as both sketchy and overly complicated. Author Emil Artin, one of the twentieth century's leading mathematicians, wrote in his Preface to this book, "I feel that this monograph will help to show that the gamma function can be thought of as one of the elementary functions, and that all of its basic properties can be established using elementary methods of the calculus." Generations of teachers and students have benefitted from Artin's masterly arguments and

precise results. Suitable for advanced undergraduates and graduate students of mathematics, his treatment examines functions, the Euler integrals and the Gauss formula, large values of x and the multiplication formula, the connection with sin x, applications to definite integrals, and other subjects.

Applied Mathematics Bruno Carpentieri 2019-09-25 This book contains well-written monographs within the broad spectrum of applied mathematics, offering an interesting reading of some of the current trends and problems in this fascinating and critically important field of science to a broad category of researchers and practitioners. Recent developments in high-performance computing are radically changing the way we do numerics. As the size of problems is expected to grow very large in the future, the gap between fast and slow algorithms is growing rapidly. Novel classes of numerical methods with reduced computational complexity are therefore needed to make the rigorous numerical solution of difficult problems arising in an industrial setting more affordable. The book is structured in four distinct parts, according to the purpose and approaches used in the development of the contributions, ranging from optimization techniques to graph-oriented approaches and approximation theory, providing a good mix of both theory and practice.

Asymptotic Expansions of Integrals Norman Bleistein 1986-01-01 Excellent introductory text, written by two experts, presents a coherent and systematic view of principles and methods. Topics include integration by parts, Watson's lemma, LaPlace's method, stationary phase, and steepest descents. Additional subjects include the Mellin transform method and less elementary aspects of the method of steepest descents. 1975 edition.

Singular Integral Equations N.I. Muskhelishvili 2012-12-06 In preparing this translation for publication certain minor modifications and additions have been introduced into the original Russian text, in order to increase its readibility and usefulness. Thus, instead of the first person, the third person has been used throughout; wherever possible footnotes have been included with the main text. The chapters and their subsections of the Russian edition have been renamed parts and chapters respectively and the last have been numbered consecutively. An authors and subject index has been added. In particular, the former has been combined with the list of references of the original text, in order to enable the reader to find quickly all information on anyone reference in which he may be especially interested. This has been considered most important with a view to the difficulties experienced outside Russia in obtaining references, published in that country. Russian names have been printed in Russian letters in the authors index, in order to overcome any possible confusion arising from transliteration.

Convex Functions and Their Applications Constantin P. Niculescu 2018-06-08 Thorough introduction to an important area of mathematics Contains recent results Includes many exercises

Calculus of Variations with Applications George McNaught Ewing 1969 Applications-oriented introduction to variational theory develops insight and promotes understanding of specialized books and research papers. Suitable for advanced undergraduate and graduate students as a primary or supplementary text. 1969 edition.

Applications of Green's Functions in Science and Engineering Michael D. Greenberg 2015-08-19 In addition to coverage of Green's function, this concise introductory treatment examines boundary value problems, generalized functions, eigenfunction expansions, partial differential equations, and acoustics. Suitable for undergraduate and graduate students. 1971 edition.

The Functions of Mathematical Physics Harry Hochstadt 2012-04-30 Comprehensive text provides a

detailed treatment of orthogonal polynomials, principal properties of the gamma function, hypergeometric functions, Legendre functions, confluent hypergeometric functions, and Hill's equation.

Mathematics for Natural Scientists II Lev Kantorovich 2016-08-02 This book covers the advanced mathematical techniques useful for physics and engineering students, presented in a form accessible to physics students, avoiding precise mathematical jargon and laborious proofs. Instead, all proofs are given in a simplified form that is clear and convincing for a physicist. Examples, where appropriate, are given from physics contexts. Both solved and unsolved problems are provided in each chapter. Mathematics for Natural Scientists II: Advanced Methods is the second of two volumes. It follows the first volume on Fundamentals and Basics.