

Series Associated with the Zeta and Related Functions

H.M. Srivastava and Junesang Choi

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Series Associated With the Zeta and Related Functions Hari M. Srivastava, Junesang Choi, 2001 In recent years there has been an increasing interest in problems involving closed form evaluations of and representations of the Riemann Zeta function at positive integer arguments as various families of series associated with the Riemann Zeta function $\zeta(s)$, the Hurwitz Zeta function $\zeta(s, a)$ and their such extensions and generalizations as for example Lerch's transcendent or the Hurwitz Lerch Zeta function $\Phi(z, s, a)$. Some of these developments have apparently stemmed from an over two century old theorem of Christian Goldbach 1690-1764 which was stated in a letter dated 1729 from Goldbach to Daniel Bernoulli 1700-1782 from recent rediscoveries of a fairly rapidly convergent series representation for $\zeta(3)$ which is actually contained in a 1772 paper by Leonhard Euler 1707-1783 and from another known series representation for $\zeta(3)$ which was used by Roger Apéry 1916-1994 in 1978 in his celebrated proof of the irrationality of $\zeta(3)$. This book is motivated essentially by the fact that the theories and applications of the various methods and techniques used in dealing with many different families of series associated with the Riemann Zeta function and its aforementioned relatives are to be found so far only in widely scattered journal articles. Thus our systematic and unified presentation of these results on the evaluation and representation of the Zeta and related functions is expected to fill a conspicuous gap in the existing books dealing exclusively with these Zeta functions.

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Zeta and q-Zeta Functions and Associated Series and Integrals Hari M. Srivastava, Junesang Choi, 2011-10-11 *Zeta and q-Zeta Functions and Associated Series and Integrals* is a thoroughly revised enlarged and updated version of *Series Associated with the Zeta and Related Functions*. Many of the chapters and sections of the book have been significantly modified or rewritten.

and a new chapter on the theory and applications of the basic or q extensions of various special functions is included This book will be invaluable because it covers not only detailed and systematic presentations of the theory and applications of the various methods and techniques used in dealing with many different classes of series and integrals associated with the Zeta and related functions but stimulating historical accounts of a large number of problems and well classified tables of series and integrals Detailed and systematic presentations of the theory and applications of the various methods and techniques used in dealing with many different classes of series and integrals associated with the Zeta and related functions

Irresistible Integrals George Boros, Victor Moll, 2004-06-21 This book first published in 2004 uses the problem of exact evaluation of definite integrals as a starting point for exploring many areas of mathematics **Series of Bessel and**

Kummer-Type Functions Árpád Baricz, Dragana Jankov Maširević, Tibor K. Pogány, 2018-03-24 This book is devoted to the study of certain integral representations for Neumann Kapteyn Schl milch Dini and Fourier series of Bessel and other special functions such as Struve and von Lommel functions The aim is also to find the coefficients of the Neumann and Kapteyn series as well as closed form expressions and summation formulas for the series of Bessel functions considered Some integral representations are deduced using techniques from the theory of differential equations The text is aimed at a mathematical audience including graduate students and those in the scientific community who are interested in a new perspective on Fourier Bessel series and their manifold and polyvalent applications mainly in general classical analysis applied mathematics and mathematical physics *Analytic Number Theory, Approximation Theory, and Special Functions* Gradimir V.

Milovanović, Michael Th. Rassias, 2014-07-08 This book in honor of Hari M Srivastava discusses essential developments in mathematical research in a variety of problems It contains thirty five articles written by eminent scientists from the international mathematical community including both research and survey works Subjects covered include analytic number theory combinatorics special sequences of numbers and polynomials analytic inequalities and applications approximation of functions and quadratures orthogonality and special and complex functions The mathematical results and open problems discussed in this book are presented in a simple and self contained manner The book contains an overview of old and new results methods and theories toward the solution of longstanding problems in a wide scientific field as well as new results in rapidly progressing areas of research The book will be useful for researchers and graduate students in the fields of mathematics physics and other computational and applied sciences **Integral Transforms and Operational Calculus** H.

M. Srivastava, 2019-11-20 Researches and investigations involving the theory and applications of integral transforms and operational calculus are remarkably wide spread in many diverse areas of the mathematical physical chemical engineering and statistical sciences This Special Issue contains a total of 36 carefully selected and peer reviewed articles which are authored by established researchers from many countries Included in this Special Issue are review expository and original research articles dealing with the recent advances on the topics of integral transforms and operational calculus as well as

their multidisciplinary applications *Contributions to the Theory of Zeta-Functions* Shigeru Kanemitsu, Haruo Tsukada, 2014-12-15 This volume provides a systematic survey of almost all the equivalent assertions to the functional equations zeta symmetry which zeta functions satisfy thus streamlining previously published results on zeta functions The equivalent relations are given in the form of modular relations in Fox H function series which at present include all that have been considered as candidates for ingredients of a series The results are presented in a clear and simple manner for readers to readily apply without much knowledge of zeta functions This volume aims to keep a record of the 150 year old heritage starting from Riemann on zeta functions which are ubiquitous in all mathematical sciences wherever there is a notion of the norm It provides almost all possible equivalent relations to the zeta functions without requiring a reader's deep knowledge on their definitions This can be an ideal reference book for those studying zeta functions *Mathematical Methods for Curves and Surfaces* Michael Floater, Tom Lyche, Marie-Laurence Mazure, Knut Morken, Larry L. Schumaker, 2014-02-03 This volume constitutes the thoroughly refereed post conference proceedings of the 8th International Conference on Mathematical Methods for Curves and Surfaces MMCS 2012 held in Oslo Norway in June July 2012 The 28 revised full papers presented were carefully reviewed and selected from 135 submissions The topics range from mathematical analysis of various methods to practical implementation on modern graphics processing units The papers reflect the newest developments in these fields and also point to the latest literature **Generalized Mathieu Series** Živorad Tomovski, Delčo Leškovski, Stefan Gerhold, 2021-11-15 The Mathieu series is a functional series introduced by mile L onard Mathieu for the purposes of his research on the elasticity of solid bodies Bounds for this series are needed for solving biharmonic equations in a rectangular domain In addition to Tomovski and his coauthors Pogany Cerone H M Srivastava J Choi etc are some of the known authors who published results concerning the Mathieu series its generalizations and their alternating variants Applications of these results are given in classical harmonic and numerical analysis analytical number theory special functions mathematical physics probability quantum field theory quantum physics etc Integral representations analytical inequalities asymptotic expansions and behaviors of some classes of Mathieu series are presented in this book A systematic study of probability density functions and probability distributions associated with the Mathieu series its generalizations and Planck's distribution is also presented The book is addressed at graduate and PhD students and researchers in mathematics and physics who are interested in special functions inequalities and probability distributions **Mathematical Methods and Modelling in Applied Sciences** Mehmet Zeki Sarıkaya, Hemen Dutta, Ahmet Ocak Akdemir, Hari M. Srivastava, 2020-03-02 This book presents a collection of original research papers from the 2nd International Conference on Mathematical and Related Sciences held in Antalya Turkey on 27-30 April 2019 and sponsored supported by D zce University Turkey the University of Jordan and the Institute of Applied Mathematics Baku State University Azerbaijan The book focuses on various types of mathematical methods and models in applied sciences new mathematical tools techniques and algorithms

related to various branches of applied sciences and important aspects of applied mathematical analysis. It covers mathematical models and modelling methods related to areas such as networks, intelligent systems, population dynamics, medical science and engineering as well as a wide variety of analytical and numerical methods. The conference aimed to foster cooperation among students, researchers and experts from diverse areas of mathematics and related sciences and to promote fruitful exchanges on crucial research in the field. This book is a valuable resource for graduate students, researchers and educators interested in applied mathematics and interactions of mathematics with other branches of science to provide insights into analysing, modelling and solving various scientific problems in applied sciences.

The Mathematica GuideBook for Symbolics Michael Trott, 2007-04-03 Mathematica is today's most advanced technical computing system. It features a rich programming environment, two and three dimensional graphics capabilities and hundreds of sophisticated, powerful programming and mathematical functions using state of the art algorithms. Combined with a user friendly interface and a complete mathematical typesetting system, Mathematica offers an intuitive, easy to handle environment of great power and utility. *The Mathematica GuideBook for Symbolics* code and text fully tailored for Mathematica 5.1 deals with Mathematica's symbolic mathematical capabilities. Structural and mathematical operations on single and systems of polynomials are fundamental to many symbolic calculations and they are covered in considerable detail. The solution of equations and differential equations as well as the classical calculus operations: differentiation, integration, summation, series expansion, limits are exhaustively treated. Generalized functions and their uses are discussed. In addition, this volume discusses and employs the classical orthogonal polynomials and special functions of mathematical physics. To demonstrate the symbolic mathematics power, a large variety of problems from mathematics and physics are discussed.

Excursions in Classical Analysis Hongwei Chen, 2010-12-31 *Excursions in Classical Analysis* will introduce students to advanced problem solving and undergraduate research in two ways: it will provide a tour of classical analysis showcasing a wide variety of problems that are placed in historical context and it will help students gain mastery of mathematical discovery and proof. The Author presents a variety of solutions for the problems in the book. Some solutions reach back to the work of mathematicians like Leonhard Euler while others connect to other beautiful parts of mathematics. Readers will frequently see problems solved by using an idea that at first glance might not even seem to apply to that problem. Other solutions employ a specific technique that can be used to solve many different kinds of problems. *Excursions* emphasizes the rich and elegant interplay between continuous and discrete mathematics by applying induction, recursion and combinatorics to traditional problems in classical analysis. The book will be useful in students' preparations for mathematics competitions, in undergraduate reading courses and seminars and in analysis courses as a supplement. The book is also ideal for self study since the chapters are independent of one another and may be read in any order.

Essays in Mathematics and its Applications Panos M. Pardalos, Themistocles M. Rassias, 2012-08-07 The volume is dedicated to Stephen Smale on the occasion of his 80th birthday. Besides his startling

1960 result of the proof of the Poincaré conjecture for all dimensions greater than or equal to five. Smale's ground breaking contributions in various fields in Mathematics have marked the second part of the 20th century and beyond. Stephen Smale has done pioneering work in differential topology, global analysis, dynamical systems, nonlinear functional analysis, numerical analysis, theory of computation and machine learning as well as applications in the physical and biological sciences and economics. In sum, Stephen Smale has manifestly broken the barriers among the different fields of mathematics and dispelled some remaining prejudices. He is indeed a universal mathematician. Smale has been honored with several prizes and honorary degrees including among others the Fields Medal 1966, The Veblen Prize 1966, the National Medal of Science 1996 and the Wolf Prize 2006/2007.

Special Functions in Fractional Calculus and Engineering Harendra Singh, H. M. Srivastava, R. K. Pandey, 2023-06-29. Special functions play a very important role in solving various families of ordinary and partial differential equations as well as their fractional order analogs which model real life situations. Owing to the non-local nature and memory effect, fractional calculus is capable of modeling many situations which arise in engineering. This book includes a collection of related topics associated with such equations and their relevance and significance in engineering. *Special Functions in Fractional Calculus and Engineering* highlights the significance and applicability of special functions in solving fractional order differential equations with engineering applications. This book focuses on the non-local nature and memory effect of fractional calculus in modeling relevant to engineering science and covers a variety of important and useful methods using special functions for solving various types of fractional order models relevant to engineering science. This book goes on to illustrate the applicability and usefulness of special functions by justifying their numerous and widespread occurrences in the solution of fractional order differential, integral and integro-differential equations. This book holds a wide variety of interconnected fundamental and advanced topics with interdisciplinary applications that combine applied mathematics and engineering sciences which are useful to graduate students, Ph.D. scholars, researchers and educators interested in special functions, fractional calculus, mathematical modeling and engineering. *Mathematical Reviews*, 2008 **Monthly**

Problem Gems Hongwei Chen, 2021-07-05. This book is an outgrowth of a collection of sixty-two problems offered in the *The American Mathematical Monthly* (AMM). The author has worked over the last two decades. Each selected problem has a central theme, contains gems of sophisticated ideas connected to important current research and opens new vistas in the understanding of mathematics. The AMM problem section provides one of the most challenging and interesting problem sections among the various journals and online sources currently available. The published problems and solutions have become a treasure trove rife with mathematical gems. The author presents either his published solution in the AMM or an alternative solution to the published one to present and develop problem solving techniques. A rich glossary of important theorems and formulas is included for easy reference. The reader may regard this book as a starter set for AMM problems, providing a jumping off point to new ideas and extending their personal lexicon of problems and solutions. This collection is

intended to encourage the reader to move away from routine exercises toward creative solutions as well as offering the reader a systematic illustration of how to organize the transition from problem solving to exploring investigating and discovering new results

Mathematical Analysis Pradip Debnath, H M Srivastava, Delfim F. M. Torres, Yeol Je Cho, 2024-12-30 Mathematical Analysis Theory and Applications provides an overview of the most up to date developments in the field presenting original contributions and surveys from a spectrum of respected academics Readers will discover numerous valuable tools and techniques to enhance their understanding of recent advancements in mathematical analysis and its applications Each chapter highlights new research directions making this book suitable for graduate students faculty and researchers with an active interest in the development of mathematical analysis and its practical implementation Minimal prerequisites in analysis topology and functional analysis are required for readers to fully benefit from the content Features Showcases the latest advancements in these areas by featuring contributions from distinguished scientists and mathematicians from around the world Suitable as a reference for postgraduate students and researchers Explores future research directions

Gauss Hypergeometric Function Ravi Dwivedi, 2024-12-02 This book presents a novel journey of the Gauss hypergeometric function and contains the different versions of the Gaussian hypergeometric function including its classical version In particular the q Gauss or basic Gauss hypergeometric function Gauss hypergeometric function with matrix arguments Gauss hypergeometric function with matrix parameters the matrix valued Gauss hypergeometric function the finite field version the extended Gauss hypergeometric function the p q Gauss hypergeometric function the incomplete Gauss hypergeometric function and the discrete analogue of Gauss hypergeometric function All these forms of the Gauss hypergeometric function and their properties are presented in such a way that the reader can understand the working algorithm and apply the same for other special functions This book is useful for UG and PG students researchers and faculty members working in the field of special functions and related areas

Modular Relations and Parity in Number Theory Kalyan Chakraborty, Shigeru Kanemitsu, Takako Kuzumaki, 2025-08-19 This book describes research problems by unifying and generalizing some remote looking objects through the functional equation and the parity relation of relevant zeta functions known as the modular relation or RHB correspondence It provides examples of zeta functions introduced as absolutely convergent Dirichlet series not necessarily with the Euler product The book generalizes this to broader cases explaining the special functions involved The extension of the Chowla Selberg integral formula and the Hardy transform are key substituting the Bochner modular relation in the zeta function of Maass forms The book also develops principles to deduce summation formulas as modular relations and addresses Chowla's problem and determinant expressions for class numbers Many books define zeta functions using Euler products excluding Epstein and Hurwitz type zeta functions Euler products are constructed from objects with a unique factorization domain property This book focuses on using the functional equation called the modular relation specifically the ramified functional equation of the Hecke type Here the gamma factor is the

product of two gamma functions leading to the Fourier Whittaker expansion and reducing to the Fourier Bessel expansion or the Chowla Selberg integral formula for Epstein zeta functions

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