

## <<特殊函数>>

### 图书基本信息

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## 内容概要

Special functions, natural generalizations of the elementary functions, have been studied for centuries. The greatest mathematicians, among them Euler, Gauss, Legendre, Eisenstein, Riemann, and Ramanujan, have laid the foundations for this beautiful and useful area of mathematics. For instance, Euler found the gamma function, which extends the factorial. The Bessel functions and Legendre polynomials play a role in three dimensions similar to the role of sine and cosine in two dimensions. This treatise presents an overview of special functions, focusing primarily on hypergeometric functions and the associated hypergeometric series, including Bessel functions and classical orthogonal polynomials. The basic building block of the functions studied in this book is the gamma function. In addition to relatively new work on gamma and beta functions, such as Selberg's multidimensional integrals, a number of important but relatively unknown nineteenth century results are included. The authors discuss Wilson's beta integral and the associated orthogonal polynomials. Some  $q$ -extensions of beta integrals and of hypergeometric series are presented with Bailey chains employed to derive some results. An introduction to spherical harmonics and applications of special functions to combinatorial problems are included. The book also deals with finite field versions of some beta integrals. The authors provide organizing ideas, motivation, and historical background for the study and application of some important special functions. This clearly expressed and readable work can serve as a learning tool and lasting reference for students and researchers in special functions, mathematical physics, differential equations, mathematical computing, number theory, and combinatorics.

## <<特殊函数>>

### 书籍目录

Preface1 The Gamma and Beta Functions 1.1 The Gamma and Beta Integrals and Functions 1.2 The Euler Reflection Formula 1.3 The Hurwitz and Riemann Zeta Functions 1.4 Stirling's Asymptotic Formula 1.5 Gauss's Multiplication Formula for 1.6 Integral Representations for Log 1.7 Kummer's Fourier Expansion of Log 1.8 Integrals of Dirichlet and Volumes of Ellipsoids 1.9 The Bohr-Mollerup Theorem 1.10 Gauss and Jacobi Sums 1.11 A Probabilistic Evaluation of the Beta Function 1.12 The p-adic Gamma Function Exercises2 The Hypergeometric Functions 2.1 The Hypergeometric Series 2.2 Euler's Integral Representation 2.3 The Hypergeometric Equation 2.4 The Barnes Integral for the Hypergeometric Function 2.5 Contiguous Relations 2.6 Dilogarithms 2.7 Binomial Sums 2.8 Dougall's Bilateral Sum 2.9 Fractional Integration by Parts and Hypergeometric Integrals Exercises3 Hypergeometric Transformations and Identities 3.1 Quadratic Transformations 3.2 The Arithmetic-Geometric Mean and Elliptic Integrals 3.3 Transformations of Balanced Series 3.4 Whipple's Formula and Hypergeometric Identities 3.5 Integral Analogs of Hypergeometric Sums 3.6 Contiguous Relations 3.7 Quadratic Transformations-Riemann's View 3.8 Indefinite Hypergeometric Summation 3.9 The W-Z Method 3.10 Contiguous Relations and Summation Methods Exercises4 Bessel Functions and Confluent Hypergeometric Functions5 Orthogonal Polynomials6 Special Orthogonal Polynomials7 Topics in Orthogonal Polynomials8 The Selberg Integral and Its Applications9 Spherical Harmonics10 Introduction to q-Series11 Partitions12 Bailey ChainsA Infinite ProductsB Summability and Fractional IntegrationC Asymptotic ExpansionsD Euler-Maclaurin Summation FormulaE Lagrange Inversion FormulaF Series Solutions of Differential EquationsBibliographyIndexSubject IndexSymbol Index

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