

特殊函数



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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 backgroud 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.

作者介绍:

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标签

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数学

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物理

分析

函数论

评论

国外的数学一般写作都用一点修辞和比喻，挺好玩的。真正讲明白特殊函数2014.3.30
：还是阅读了小谷正雄的《特殊函数》，这本书里有些过于呆板和复杂的证明，我才理

解。其实关于欧拉函数的渐进展开完全可以放在最速下降法之后讲完斯特林公式再讲，本书的处理有点复杂化了；关于特殊函数的黎曼公式表示，我一直没有理解：其实要加入椭圆坐标，再加入常微分方程的奇点理论，就ok

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