Analytic Functions Of Several Complex Variables Ams Chelsea Publishing

This book is an account of the theory of Hardy spaces in one dimension, with emphasis on some of the exciting developments of the past two decades or so. The last seven of the ten chapters are devoted in the main to these recent developments. The motif of the theory of Hardy spaces is the interplay between real, complex, and abstract analysis. While paying proper attention to each of the three aspects, the author has underscored the effectiveness of the methods coming from real analysis, many of them developed as part of a program to extend the theory to Euclidean spaces, where the complex methods are not available.

The purpose of this book is to present the classical analytic function theory of several variables as a standard subject in a course of mathematics after learning the elementary materials (sets, general topology, algebra, one complex variable). This includes the essential parts of Grauert–Remmert's two volumes, GL227(236) (Theory of Stein spaces) and GL265 (Coherent analytic sheaves) with a lowering of the level for novice graduate students (here, Grauert's direct image theorem is limited to the case of finite maps).The core of the theory is "Oka's Coherence", found and proved by Kiyoshi Oka. It is indispensable, not only in the study of complex analysis and complex geometry, but also in a large area of modern mathematics. In this book, just after an introductory chapter on holomorphic functions (Chap. 1), we prove Oka's First Coherence Theorem for holomorphic functions in Chap. 2. This defines a unique character of the book compared with other books on this subject, in which the notion of coherence appears much later.The present book, consisting of nine chapters, gives complete treatments of the following items: Coherence of sheaves of holomorphic functions (Chap. 2); Oka–Cartan's Fundamental Theorem (Chap. 4); Coherence of ideal sheaves of complex analytic subsets (Chap. 6); Coherence of the normalization sheaves of complex spaces (Chap. 6); Grauert's Finiteness Theorem (Chaps. 7, 8); Oka's Theorem for Riemann domains (Chap. 8). The theories of sheaf cohomology and domains of holomorphy are also presented (Chaps. 3, 5). Chapter 6 deals with the theory of complex analytic subsets. Chapter 8 is devoted to the applications of formerly obtained results, proving Cartan–Serre's Theorem and Kodaira's Embedding Theorem. In Chap. 9, we discuss the historical development of "Coherence".It is difficult to find a book at this level that treats all of the above subjects in a completely self-contained manner. In the present volume, a number of classical proofs are improved and simplified, so that the contents are easily accessible for beginning graduate students.

Multiple Dirichlet series are Dirichlet series in several complex variables. A multiple Dirichlet series is said to be perfect if it satisfies a finite group of functional equations and has meromorphic continuation everywhere. The earliest examples came from Mellin transforms of metaplectic Eisenstein series and have been intensively studied over the last twenty years. More recently, many other examples have been discovered and it appears that all the classical theorems on moments of L-functions as well as the conjectures (such as those predicted by random matrix theory) can now be obtained via the theory of multiple Dirichlet series.Furthermore, new results, not obtainable by other methods, are just coming to light. This volume offers an account of some of the major research to date and the opportunities for the future. It includes an exposition of the main results in the theory of multiple Dirichlet series, and papers on moments of zeta- and L-functions, on new examples of multiple Dirichlet series, and on developments in the allied fields of automorphic forms and analytic number theory.

The book examines in some depth two important classes of point processes, determinantal processes and ``Gaussian zeros'', i.e., zeros of random analytic functions with Gaussian coefficients. These processes share a property of ``point-repulsion'', where distinct points are less likely to fall close to each other than in processes, such as the Poisson process, that arise from independent sampling. Nevertheless, the treatment in the book emphasizes the use of independence: for random power series, the independence of coefficients is key; for determinantal processes, the number of points in a domain is a sum of independent indicators, and this yields a satisfying explanation of the central limit theorem (CLT) for this point count. Another unifying theme of the book is invariance of considered point processes under natural transformation groups. The book strives for balance between general theory and concrete examples. On the one hand, it presents a primer on modern techniques on the interface of probability and analysis. On the other hand, a wealth of determinantal processes of intrinsic interest are analyzed; these arise from random spanning trees and eigenvalues of random matrices, as well as from special power series with determinantal zeros. The material in the book formed the basis of a graduate course given at the IAS-Park City Summer School in 2007; the only background knowledge assumed can be acquired in first-year graduate courses in analysis and probability.

Generalized Analytic Functions is concerned with foundations of the general

theory of generalized analytic functions and some applications to problems of differential geometry and theory of shells. Some classes of functions and operators are discussed, along with the reduction of a positive differential quadratic form to the canonical form. Boundary value problems and infinitesimal bendings of surfaces are also considered. Comprised of six chapters, this volume begins with a detailed treatment of various problems of the general theory of generalized analytic functions as as well as boundary value problems. The reader is introduced to some classes of functions and functional spaces, with emphasis on functions of two independent variables. Subsequent chapters focus on the problem of reducing a positive differential quadratic form to the canonical form; basic properties of solutions of elliptic systems of partial differential equations of the first order, in a two-dimensional domain; and some boundary value problems for an elliptic system of equations of the first order and for an elliptic equation of the second order, in a two-dimensional domain. The final part of the book deals with problems of the theory of surfaces and the membrane theory of shells. This book is intended for students of advanced courses of the mechanico-mathematical faculties, postgraduates, and research workers.
In this textbook, a concise approach to complex analysis of one and several variables is presented. After an introduction of Cauchy‘s integral theorem

general versions of Runge‘s approximation theorem and Mittag-Leffler‘s theorem are discussed. The fi rst part ends with an analytic characterization of simply connected domains. The second part is concerned with functional analytic methods: Fréchet and Hilbert spaces of holomorphic functions, the Bergman kernel, and unbounded operators on Hilbert spaces to tackle the theory of several variables, in particular the inhomogeneous Cauchy-Riemann equations and the d-bar Neumann operator. Contents Complex numbers and functions Cauchy’s Theorem and Cauchy’s formula Analytic continuation Construction and approximation of holomorphic functions Harmonic functions Several complex variables Bergman spaces The canonical solution operator to Nuclear Fréchet spaces of holomorphic functions The -complex The twisted -complex and Schrödinger operators

Since the 1960s, there has been a flowering in higher-dimensional complex analysis. Both classical and new results in this area have found numerous applications in analysis, differential and algebraic geometry, and, in particular, contemporary mathematical physics. In many areas of modern mathematics, the mastery of the foundations of higher-dimensional complex analysis has become necessary for any specialist. Intended as a first study of higher-dimensional complex analysis, this book covers the theory of holomorphic functions of several complex variables, holomorphic mappings, and submanifolds of complex Euclidean space.

An Introduction to Complex Analysis in Several Variables

This highly regarded text is directed toward advanced undergraduates and graduate students in mathematics who are interested in developing a firm foundation in the theory of functions of a complex variable. The treatment departs from traditional presentations in its early development of a rigorous discussion of the theory of multiple-valued analytic functions on the basis of analytic continuation. Thus it offers an early introduction of Riemann surfaces, conformal mapping, and the applications of residue theory. M. A. Evgrafov focuses on aspects of the theory that relate to modern research and assumes an acquaintance with the basics of mathematical analysis derived from a year of advanced calculus. Starting with an introductory chapter containing the fundamental results concerning limits, continuity, and integrals, the book addresses analytic functions and their properties, multiple-valued analytic functions, singular points and expansion in series, the Laplace transform, harmonic and subharmonic functions, extremal problems and distribution of values, and other subjects. Chapters are largely self-contained, making this volume equally suitable for the classroom or independent study.

'Kiyoshi Oka, at the beginning of his research, regarded the collection of problems which he encountered in the study of domains of holomorphy as large mountains which separate today and tomorrow. Thus, he believed that there could be no essential progress in analysis without climbing over these mountains...this book is a worthwhile initial step for the reader in order to understand the mathematical world which was created by Kiyoshi Oka' - from the Preface. This book explains results in the theory of functions of several complex variables which were mostly established from the late nineteenth century through the middle of the twentieth century. In the work, the author introduces the mathematical world created by his advisor, Kiyoshi Oka.In this volume, Oka's work is divided into two parts. The first is the study of analytic functions in univalent domains in ${\mathbf C}^n$. Here Oka proved that three concepts are equivalent: domains of holomorphy, holomorphically convex domains, and pseudoconvex domains; and moreover that the Poincare problem, the Cousin problems, and the Runge problem, when stated properly, can be solved in domains of holomorphy satisfying the appropriate conditions.The second part of Oka's work established a method for the study of analytic functions defined in a ramified domain over ${\mathbf C}^n$ in which the branch points are considered as interior points of the domain. Here analytic functions in an analytic space are treated, which is a slight generalization of a ramified domain over ${\mathbf C}^n$. In writing the book, the author's goal was to bring to readers a real understanding of Oka's original papers. This volume is an English translation of the original Japanese edition, published by the University of Tokyo Press (Japan). It would make a suitable course text for advanced graduate level introductions to several complex variables.

This volume is a collection of research-and-survey articles by eminent and active workers around the world on the various areas of current research in the theory of analytic functions. Many of these articles emerged essentially from the proceedings of, and various deliberations at, three recent conferences in Japan and Korea: An International Seminar on Current Topics in Univalent Functions and Their Applications which was held in August 1990, in conjunction with the International Congress of Mathematicians at Kyoto, at Kinki University in Osaka; An International Seminar on Univalent Functions, Fractional Calculus, and Their Applications which was held in October 1990 at Fukuoka University; and also the Japan-Korea Symposium on Univalent Functions which was held in January 1991 at Gyeongsang National University in Chinju. Contents:Univalent Logharmonic Extensions onto the Unit Disk or onto an Annulus (Z Abdulhadi & W Hengartner)Hypergeometric Functions and Elliptic Integrals (G D Anderson et al.)A Certain Class of Carathéodory Functions Defined by Conditions on the Unit Circle (J Fuka & Z J Jakubowski)Recent Advances in the Theory of Zero Sets of the Bergman Spaces (E A LeBlanc)Spherical Linear Invariance and Uniform Local Spherical Convexity (W C Ma & D Minda)A Special Differential Subordination and Its Application to Univalency Conditions (S S Miller & P T Mocanu)On the Bernardi Integral Operator (M Nunokawa & D K Thomas)The Quasi-Hadamard Products of Certain Analytic Functions (S Owa)Analytic Solutions of a Class of Briot-Bouquet Differential Equations (S Owa & H M Srivastava)A Certain Class of Generalized Hypergeometric Functions Associated with the Hardy Space of Analytic Functions (H M Srivastava)On the Coefficients of the Univalent Functions of the Nevalinna Classes N1 and N2 (P G Todorov)and other papers Readership: Pure and applied mathematicians. keywords:Analytic Functions;Univalent Functions;Geometric Function Theory;Meromorphic Functions;Multivalent Functions;Hypergeometric Functions;Fractional Calculus;Integral Operators;Starlike Functions;Convex Functions;Close-to-Convex Functions;Special Functions;Convolution Operators;Bergman Spaces;Elliptic Integrals;Briot-Bouquet Differential Equations;Caratheodory Functions;Nevanlinna Classes;Schwarz Functions;Spiral-Like Functions;Dynamical Systems

Analytic Functions of Several Complex VariablesAmerican Mathematical Soc. The theory of analytic functions of several complex variables enjoyed a period of remarkable development in the middle part of the twentieth century. After initial successes by Poincare and others in the late 19th and early 20th centuries, the theory encountered obstacles that prevented it from growing quickly into an analogue of the theory for functions of one complex variable. Beginning in the 1930s, initially through the work of Oka, then H. Cartan, and continuing with the work of Grauert, Remmert, and others, new tools were introduced into the theory of several complex variables that resolved many of the open problems and fundamentally changed the landscape of the subject. These tools included a central role for sheaf theory and increased uses of topology and algebra. The book by Gunning and Rossi was the first of the modern era of the theory of several complex variables, which is distinguished by the use of these methods. The intention of Gunning and Rossi's book is to provide an extensive introduction to the Oka-Cartan theory and some of its applications, and to the general theory of analytic spaces. Fundamental concepts and techniques are discussed as early as possible. The first chapter covers material suitable for a one-semester graduate course, presenting many of the central problems and techniques, often in special cases. The later chapters give more detailed expositions of sheaf theory for analytic functions and the theory of complex analytic spaces. Since its original publication, this book has become a classic resource for the modern approach to functions of several complex variables and the theory of analytic spaces. Further information about this book, including updates, can be found at the following URL: www.ams.org/bookpages/chel-368.

Plurisubharmonic functions playa major role in the theory of functions of several complex variables. The extensiveness of plurisubharmonic functions, the simplicity of their definition together with the richness of their properties and. most importantly, their close connection with holomorphic functions have assured plurisubharmonic functions a lasting place in multidimensional complex analysis. (Pluri)subharmonic functions first made their appearance in the works of Hartogs at the beginning of the century. They figure in an essential way, for example, in the proof of the famous theorem of Hartogs (1906) on joint holomorphicity. Defined at first on the complex plane IC, the class of subharmonic functions became thereafter one of the most fundamental tools in the investigation of analytic functions of one or several variables. The theory of subharmonic functions was developed and generalized in various directions: subharmonic functions in Euclidean space IRn, plurisubharmonic functions in complex space en and others. Subharmonic functions and the foundations ofthe associated classical poten tial theory are sufficiently well exposed in the literature, and so we introduce here only a few fundamental results which we require. More detailed expositions can be found in the monographs of Privalov (1937), Brelot (1961), and Landkof (1966). See also Brelot (1972), where a history of the development of the theory of subharmonic functions is given.

"This book presents a basic introduction to complex analysis in both an interesting and a rigorous manner. It contains enough material for a full year's course, and the choice of material treated is reasonably standard and should be satisfactory for most first courses in complex analysis. The approach to each topic appears to be carefully thought out both as to mathematical treatment and pedagogical presentation, and the end result is a very satisfactory book." --MATHSCINET

Basic treatment includes existence theorem for solutions of differential systems where data is analytic, holomorphic functions, Cauchy's integral, Taylor and Laurent expansions, more. Exercises. 1973 edition.

One service mathematics has rendered the 'Et moi, .. " si j'avait so comment en revenir, human race. It has put common sense back je n'y semis point aile.' Jules Verne where it belongs, on the topmost shelf next to the dusty canister labelled 'discarded non The series is divergent; therefore we may be sense'. able to do

something with it Eric T. Bell o. Heaviside Mathematics is a tool for thought. A highly necessary tool in a world where both feedback and non linearities abound. Similarly, all kinds of parts of mathematics serve as tools for other parts and for other sciences. Applying a simple rewriting rule to the quote on the right above one finds such statements as: 'One service topology has rendered mathematical physics .. .'; 'One service logic has rendered com puter science .. .'; 'One service category theory has rendered mathematics .. .'. All arguably true. And all statements obtainable this way form part of the raison d'etre of this series.
At almost all academic institutions worldwide, complex variables and analytic functions are utilized in courses on applied mathematics, physics, engineering, and other related subjects. For most students, formulas alone do not provide a sufficient introduction to this widely taught material, yet illustrations of functions are sparse in current books on the topic. This is the first primary introductory textbook on complex variables and analytic functions to make extensive use of functional illustrations. Aiming to reach undergraduate students entering the world of complex variables and analytic functions, this book utilizes graphics to visually build on familiar cases and illustrate how these same functions extend beyond the real axis. It covers several important topics that are omitted in nearly all recent texts, including techniques for analytic continuation and discussions of

elliptic functions and of Wiener–Hopf methods. It also presents current advances in research, highlighting the subject’s active and fascinating frontier. The primary audience for this textbook is undergraduate students taking an introductory course on complex variables and analytic functions. It is also geared toward graduate students taking a second semester course on these topics, engineers and physicists who use complex variables in their work, and students and researchers at any level who want a reference book on the subject.