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Nevanlinna Theory, Normal Families, and Algebraic Differential Equations - Norbert Steinmetz 2017-07-24

This book offers a modern introduction to Nevanlinna theory and its intricate relation to the theory of normal families, algebraic functions, asymptotic series, and algebraic differential equations. Following a comprehensive treatment of Nevanlinna's theory of value distribution, the author presents advances made since Hayman's work on the value distribution of differential polynomials and illustrates how value- and pair-sharing problems are linked to algebraic curves and Briot-Bouquet differential equations. In addition to discussing classical applications of Nevanlinna theory, the book outlines state-of-the-art research, such as the effect of the Yosida and Zalcman-Pang method of re-scaling to algebraic differential equations, and presents the Painlevé-Yosida theorem, which relates Painlevé transcendents and solutions to selected 2D Hamiltonian systems to certain Yosida classes of meromorphic functions. Aimed at graduate students interested in recent developments in the field and researchers working on related problems, *Nevanlinna Theory, Normal Families, and Algebraic Differential Equations* will also be of interest to complex analysts looking for an introduction to various topics in the subject area. With examples, exercises and proofs seamlessly intertwined with the body of the text, this book is particularly suitable for the more advanced reader.

Formal Power Series and Linear Systems of Meromorphic Ordinary Differential Equations - Werner Balser 2008-01-19

Simple Ordinary Differential Equations may have solutions in terms of power series whose coefficients grow at such a rate that the series has a radius of convergence equal to zero. In fact, every linear meromorphic system has a formal solution of a certain form, which can be relatively easily computed, but which generally involves such power series diverging everywhere. In this book the author presents the classical theory of meromorphic systems of ODE in the new light shed upon it by the recent achievements in the theory of summability of formal power series.

Grants and Awards for Fiscal Year... - National Science Foundation (U.S.) 1979

Semilinear Elliptic Equations - Takashi Suzuki 2020-10-12

This authoritative monograph presents in detail classical and modern methods for the study of semilinear elliptic equations, that is, methods to study the qualitative properties of solutions using variational techniques, the maximum principle, blowup analysis, spectral theory, topological methods, etc. The book is self-contained and is addressed to experienced and beginning researchers alike.

Complex Analysis - Serge Lang 2013-06-29

The present book is meant as a text for a course on complex analysis at the advanced undergraduate level, or first-year graduate level. Somewhat more material has been included than can be covered at leisure in one term, to give opportunities for the instructor to exercise his taste, and lead the course in whatever direction strikes his fancy at the time. A large number of routine exercises are included for the more standard portions, and a few harder exercises of striking theoretical interest are also included, but may be omitted in courses addressed to less advanced students. In some sense, I think the classical German prewar texts were the best (Hurwitz-Courant, Knopp, Bieberbach, etc.) and I would recommend to anyone to look through them. More recent texts have emphasized connections with real analysis, which is important, but at the cost of exhibiting succinctly and clearly what is peculiar about complex analysis: the power series expansion, the uniqueness of analytic continuation, and the calculus of residues. The systematic elementary development of formal and convergent power series was standard fare in the German texts, but only Cartan, in the more recent books, includes this material, which I think is quite essential, e. g. , for differential equations. I have written a short text, exhibiting these features, making it applicable to a wide variety of tastes. The book essentially decomposes into two parts.

Real Analysis -

Complex Analysis - Dennis G. Zill 2013-09-20

Designed for the undergraduate student with a calculus background but no prior experience with complex analysis, this text discusses the theory of the most relevant mathematical topics in a student-friendly manner. With a clear and straightforward writing style, concepts are introduced through numerous examples, illustrations, and applications. Each section of the text contains an extensive exercise set containing a range of

computational, conceptual, and geometric problems. In the text and exercises, students are guided and supported through numerous proofs providing them with a higher level of mathematical insight and maturity. Each chapter contains a separate section devoted exclusively to the applications of complex analysis to science and engineering, providing students with the opportunity to develop a practical and clear understanding of complex analysis. The Mathematica syntax from the second edition has been updated to coincide with version 8 of the software. --

Handbook of Complex Analysis - Reiner Kuhnau 2004-12-09

Geometric Function Theory is that part of Complex Analysis which covers the theory of conformal and quasiconformal mappings. Beginning with the classical Riemann mapping theorem, there is a lot of existence theorems for canonical conformal mappings. On the other side there is an extensive theory of qualitative properties of conformal and quasiconformal mappings, concerning mainly a priori estimates, so called distortion theorems (including the Bieberbach conjecture with the proof of the Branges). Here a starting point was the classical Schwarz lemma, and then Koebe's distortion theorem. There are several connections to mathematical physics, because of the relations to potential theory (in the plane). The Handbook of Geometric Function Theory contains also an article about constructive methods and further a Bibliography including applications eg: to electrostatic problems, heat conduction, potential flows (in the plane). · A collection of independent survey articles in the field of Geometric Function Theory · Existence theorems and qualitative properties of conformal and quasiconformal mappings · A bibliography, including many hints to applications in electrostatics, heat conduction, potential flows (in the plane).

Complex Analysis - Elias M. Stein 2010-04-22

With this second volume, we enter the intriguing world of complex analysis. From the first theorems on, the elegance and sweep of the results is evident. The starting point is the simple idea of extending a function initially given for real values of the argument to one that is defined when the argument is complex. From there, one proceeds to the main properties of holomorphic functions, whose proofs are generally short and quite illuminating: the Cauchy theorems, residues, analytic continuation, the argument principle. With this background, the reader is ready to learn a wealth of additional material connecting the subject with other areas of mathematics: the Fourier transform treated by contour integration, the zeta function and the prime number theorem, and an introduction to elliptic functions culminating in their application to combinatorics and number theory. Thoroughly developing a subject with many ramifications, while striking a careful balance between conceptual insights and the technical underpinnings of rigorous analysis, *Complex Analysis* will be welcomed by students of mathematics, physics, engineering and other sciences. The Princeton Lectures in Analysis represents a sustained effort to introduce

the core areas of mathematical analysis while also illustrating the organic unity between them. Numerous examples and applications throughout its four planned volumes, of which *Complex Analysis* is the second, highlight the far-reaching consequences of certain ideas in analysis to other fields of mathematics and a variety of sciences. Stein and Shakarchi move from an introduction addressing Fourier series and integrals to in-depth considerations of complex analysis; measure and integration theory, and Hilbert spaces; and, finally, further topics such as functional analysis, distributions and elements of probability theory.

Complex Analysis - John M. Howie 2003

Complex analysis can be a difficult subject and many introductory texts are just too ambitious for today's students. This book takes a lower starting point than is traditional and concentrates on explaining the key ideas through worked examples and informal explanations, rather than through "dry" theory.

Measure Theory and Probability - Malcolm Adams 2013-04-17

"...the text is user friendly to the topics it considers and should be very accessible...Instructors and students of statistical measure theoretic courses will appreciate the numerous informative exercises; helpful hints or solution outlines are given with many of the problems. All in all, the text should make a useful reference for professionals and students."—The Journal of the American Statistical Association

Complex Analysis and Dynamical Systems VI - Lawrence Zalcman 2016-05-19

This volume contains the proceedings of the Sixth International Conference on Complex Analysis and Dynamical Systems, held from May 19–24, 2013, in Nahariya, Israel, in honor of David Shoikhet's sixtieth birthday. The papers range over a wide variety of topics in complex analysis, quasiconformal mappings, and complex dynamics. Taken together, the articles provide the reader with a panorama of activity in these areas, drawn by a number of leading figures in the field. They testify to the continued vitality of the interplay between classical and modern analysis. The companion volume (*Contemporary Mathematics*, Volume 653) is devoted to partial differential equations, differential geometry, and radon transforms.

Advanced Methods for the Solution of Differential Equations - Marvin E. Goldstein 1973

Complex Analysis - Jane P. Gilman 2007-12-17

Organizing the basic material of complex analysis in a unique manner, the authors of this versatile book aim is to present a precise and concise treatment of those parts of complex analysis that should be familiar to every research mathematician.

Geometric Analysis - Joaquín Pírez 2012-07-16

This volume contains research and expository articles from the courses and talks given at the RSME Lluís A. Santaló Summer School, "Geometric

Analysis", held June 28-July 2, 2010, in Granada, Spain. The goal of the Summer School was to present some of the many advances currently taking place in the interaction between partial differential equations and differential geometry, with special emphasis on the theory of minimal surfaces. This volume includes expository articles about the current state of specific problems involving curvature and partial differential equations, with interactions to neighboring fields such as probability. An introductory, mostly self-contained course on constant mean curvature surfaces in Lie groups equipped with a left invariant metric is provided. The volume will be of interest to researchers, post-docs, and advanced PhD students in the interface between partial differential equations and differential geometry.

Galois Theory of Linear Differential Equations - Marius van der Put
2012-12-06

From the reviews: "This is a great book, which will hopefully become a classic in the subject of differential Galois theory. [...] the specialist, as well as the novice, have long been missing an introductory book covering also specific and advanced research topics. This gap is filled by the volume under review, and more than satisfactorily." Mathematical Reviews

Theory of Functions of a Complex Variable, Volume 1 - Constantin Carathéodory 2001-05-30

Presents a translation of the last of Caratheodory's celebrated text books, Funktiontheorie, Volume 1.

Complex Analysis through Examples and Exercises - E. Pap 2013-03-09

The book *Complex Analysis through Examples and Exercises* has come out from the lectures and exercises that the author held mostly for mathematician and physicists. The book is an attempt to present the rather involved subject of complex analysis through an active approach by the reader. Thus this book is a complex combination of theory and examples. Complex analysis is involved in all branches of mathematics. It often happens that the complex analysis is the shortest path for solving a problem in real circumstances. We are using the (Cauchy) integral approach and the (Weierstrass) power series approach. In the theory of complex analysis, on the one hand one has an interplay of several mathematical disciplines, while on the other various methods, tools, and approaches. In view of that, the exposition of new notions and methods in our book is taken step by step. A minimal amount of expository theory is included at the beginning of each section, the Preliminaries, with maximum effort placed on well selected examples and exercises capturing the essence of the material. Actually, I have divided the problems into two classes called Examples and Exercises (some of them often also contain proofs of the statements from the Preliminaries). The examples contain complete solutions and serve as a model for solving similar problems given in the exercises. The readers are left to find the solution in the exercises; the answers, and, occasionally, some hints, are still given.

Complex Analysis - Mario Gonzalez 2018-03-09

A selection of some important topics in complex analysis, intended as a

sequel to the author's Classical complex analysis (see preceding entry).

The five chapters are devoted to analytic continuation; conformal mappings, univalent functions, and nonconformal mappings; entire function; meromorphic fu

Value Distribution Theory and Related Topics - Grigor A. Barsegian
2004-05-31

The volume consists of a collection of articles on the value distribution theory and its applications, both in one and several variables. The applied parts include problems related to geometric function theory, linear operators of entire functions, differential and functional equations, uniqueness and interpolation. A unique feature of the book is an extensive research program by the first editor on the Gamma-lines approach to analysis. Some aspects in the book consider Diophantine type equations for meromorphic functions, offering new challenges to complex analysis. Audience: Researchers and postgraduate students in complex analysis, differential equations and algebraic geometry would find this book of interest.

The William Lowell Putnam Mathematical Competition Problems and Solutions - Andrew M. Gleason 1980

Back by popular demand, the MAA is pleased to reissue this outstanding collection of problems and solutions from the Putnam Competitions covering the years 1938-1964. Problemists the world over, including all past and future Putnam Competitors, will revel in mastering the difficulties posed by this collection of problems from the first 25 William Lowell Putnam Competitions.

Function Theory of One Complex Variable - Robert Everist Greene 2006

Complex analysis is one of the most central subjects in mathematics. It is compelling and rich in its own right, but it is also remarkably useful in a wide variety of other mathematical subjects, both pure and applied. This book is different from others in that it treats complex variables as a direct development from multivariable real calculus. As each new idea is introduced, it is related to the corresponding idea from real analysis and calculus. The text is rich with examples and exercises that illustrate this point. The authors have systematically separated the analysis from the topology, as can be seen in their proof of the Cauchy theorem. The book concludes with several chapters on special topics, including full treatments of special functions, the prime number theorem, and the Bergman kernel. The authors also treat H^p spaces and Painlevé's theorem on smoothness to the boundary for conformal maps. This book is a text for a first-year graduate course in complex analysis. It is an engaging and modern introduction to the subject, reflecting the authors' expertise both as mathematicians and as expositors.

Complex Analysis - Friedrich Haslinger 2017-11-20

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 first 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 $\bar{\partial}$ -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 $\bar{\partial}$ -complex The twisted $\bar{\partial}$ -complex and Schrödinger operators

Complex Function Theory - Donald Sarason 2007-12-20

Complex Function Theory is a concise and rigorous introduction to the theory of functions of a complex variable. Written in a classical style, it is in the spirit of the books by Ahlfors and by Saks and Zygmund. Being designed for a one-semester course, it is much shorter than many of the standard texts. Sarason covers the basic material through Cauchy's theorem and applications, plus the Riemann mapping theorem. It is suitable for either an introductory graduate course or an undergraduate course for students with adequate preparation. The first edition was published with the title Notes on Complex Function Theory.

Complex Analysis - Teodor Bulboacă 2019-07-08

This book is an in-depth and modern presentation of important classical results in complex analysis and is suitable for a first course on the topic, as taught by the authors at several universities. The level of difficulty of the material increases gradually from chapter to chapter, and each chapter contains many exercises with solutions and applications of the results, with the particular goal of showcasing a variety of solution techniques.

Real Analysis: A Comprehensive Course in Analysis, Part 1 - Barry Simon 2015-11-02

A Comprehensive Course in Analysis by Poincaré Prize winner Barry Simon is a five-volume set that can serve as a graduate-level analysis textbook with a lot of additional bonus information, including hundreds of problems and numerous notes that extend the text and provide important historical background. Depth and breadth of exposition make this set a valuable reference source for almost all areas of classical analysis. Part 1 is devoted to real analysis. From one point of view, it presents the infinitesimal calculus of the twentieth century with the ultimate integral calculus (measure theory) and the ultimate differential calculus (distribution theory). From another, it shows the triumph of abstract spaces: topological spaces, Banach and Hilbert spaces, measure spaces, Riesz spaces, Polish spaces, locally convex spaces, Fréchet spaces, Schwartz space, and spaces. Finally it is the study of big techniques, including the Fourier series and transform, dual spaces, the Baire category, fixed point theorems, probability ideas, and Hausdorff dimension. Applications include

the constructions of nowhere differentiable functions, Brownian motion, space-filling curves, solutions of the moment problem, Haar measure, and equilibrium measures in potential theory.

Complex Analysis and Potential Theory -

Conformal Mappings and Boundary Value Problems - Guo-Chun Wen

Translated from the Chinese. Conformal mapping and boundary value problems are two major branches of complex function theory. The former is the geometric theory of analytic functions, and the latter is the analysis theory governing the close relationship between abstract theory and many concrete problems. Topics include applications of Cauchy type integrals, the Hilbert boundary value problem, quasiconformal mappings, and basic boundary value problems for harmonic functions. Annotation copyright by Book News, Inc., Portland, OR

Complex Analysis in one Variable - NARASIMHAN 2012-12-06

This book is based on a first-year graduate course I gave three times at the University of Chicago. As it was addressed to graduate students who intended to specialize in mathematics, I tried to put the classical theory of functions of a complex variable in context, presenting proofs and points of view which relate the subject to other branches of mathematics. Complex analysis in one variable is ideally suited to this attempt. Of course, the branches of mathematics one chooses, and the connections one makes, must depend on personal taste and knowledge. My own leaning towards several complex variables will be apparent, especially in the notes at the end of the different chapters. The first three chapters deal largely with classical material which is available in the many books on the subject. I have tried to present this material as efficiently as I could, and, even here, to show the relationship with other branches of mathematics. Chapter 4 contains a proof of Picard's theorem; the method of proof I have chosen has far-reaching generalizations in several complex variables and in differential geometry. The next two chapters deal with the Runge approximation theorem and its many applications. The presentation here has been strongly influenced by work on several complex variables.

Introduction to Topological Manifolds - John M. Lee 2006-04-06

Manifolds play an important role in topology, geometry, complex analysis, algebra, and classical mechanics. Learning manifolds differs from most other introductory mathematics in that the subject matter is often completely unfamiliar. This introduction guides readers by explaining the roles manifolds play in diverse branches of mathematics and physics. The book begins with the basics of general topology and gently moves to manifolds, the fundamental group, and covering spaces.

Elementary Theory of Analytic Functions of One or Several Complex Variables - Henri Cartan 2013-04-22

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.

Complex Analysis - Fifth Romanian-Finnish Seminar. Proceedings of the Seminar Held in Bucharest, June 28 - July 3, 1981 - C. Andreian Cazacu
2006-11-15

An Introduction to Complex Analysis and Geometry - John P. D'Angelo
2010

Provides the reader with a deep appreciation of complex analysis and how this subject fits into mathematics. The first four chapters provide an introduction to complex analysis with many elementary and unusual applications. Chapters 5 to 7 develop the Cauchy theory and include some striking applications to calculus. Chapter 8 glimpses several appealing topics, simultaneously unifying the book and opening the door to further study.

Functions of One Complex Variable I - John B. Conway 1978-08-24

"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

Romanian-Finnish Seminar on Complex Analysis - C. Andreian Cazacu
2006-11-14

Basic Complex Analysis - Jerrold E. Marsden 1999

Basic Complex Analysis skillfully combines a clear exposition of core theory with a rich variety of applications. Designed for undergraduates in mathematics, the physical sciences, and engineering who have completed two years of calculus and are taking complex analysis for the first time..

The Numerical Solution of Elliptic Equations - Garrett Birkhoff 1971

A concise survey of the current state of knowledge in 1972 about solving elliptic boundary-value eigenvalue problems with the help of a computer. This volume provides a case study in scientific computing—the art of utilizing physical intuition, mathematical theorems and algorithms, and modern computer technology to construct and explore realistic models of problems arising in the natural sciences and engineering.

Complex Analysis - Rubí E. Rodríguez 2012-11-28

The authors' aim here is to present a precise and concise treatment of those parts of complex analysis that should be familiar to every research mathematician. They follow a path in the tradition of Ahlfors and Bers by dedicating the book to a very precise goal: the statement and proof of the Fundamental Theorem for functions of one complex variable. They discuss

the many equivalent ways of understanding the concept of analyticity, and offer a leisure exploration of interesting consequences and applications. Readers should have had undergraduate courses in advanced calculus, linear algebra, and some abstract algebra. No background in complex analysis is required.

A Course in Complex Analysis and Riemann Surfaces - Wilhelm Schlag
2014-08-06

Complex analysis is a cornerstone of mathematics, making it an essential element of any area of study in graduate mathematics. Schlag's treatment of the subject emphasizes the intuitive geometric underpinnings of elementary complex analysis that naturally lead to the theory of Riemann surfaces. The book begins with an exposition of the basic theory of holomorphic functions of one complex variable. The first two chapters constitute a fairly rapid, but comprehensive course in complex analysis.

The third chapter is devoted to the study of harmonic functions on the disk and the half-plane, with an emphasis on the Dirichlet problem. Starting with the fourth chapter, the theory of Riemann surfaces is developed in some detail and with complete rigor. From the beginning, the geometric aspects are emphasized and classical topics such as elliptic functions and elliptic integrals are presented as illustrations of the abstract theory. The special role of compact Riemann surfaces is explained, and their connection with algebraic equations is established. The book concludes with three chapters devoted to three major results: the Hodge decomposition theorem, the Riemann-Roch theorem, and the uniformization theorem. These chapters present the core technical apparatus of Riemann surface theory at this level. This text is intended as a detailed, yet fast-paced intermediate introduction to those parts of the theory of one complex variable that seem most useful in other areas of mathematics, including geometric group theory, dynamics, algebraic geometry, number theory, and functional analysis. More than seventy figures serve to illustrate concepts and ideas, and the many problems at the end of each chapter give the reader ample opportunity for practice and independent study.

Complex Analysis and Potential Theory - Tahir Aliyev Azero?lu 2007

This volume gathers the contributions from outstanding mathematicians, such as Samuel Krushkal, Reiner Kuhnau, Chung Chun Yang, Vladimir Miklyukov and others. It will help researchers to solve problems on complex analysis and potential theory and discuss various applications in engineering. The contributions also update the reader on recent developments in the field. Moreover, a special part of the volume is completely devoted to the formulation of some important open problems and interesting conjectures.