

# Complex Analysis For Mathematics And Engineering

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**Applied Complex Variables** - John W. Dettman 2012-05-07

Fundamentals of analytic function theory — plus lucid exposition of 5 important applications: potential theory, ordinary differential equations, Fourier transforms, Laplace transforms, and asymptotic expansions. Includes 66 figures.

*Complex Analysis for Mathematics and Engineering* - John H. Mathews 2006

Complex Analysis for Mathematics and Engineering, Fifth Edition is intended for undergraduate students majoring in mathematics, physics, or engineering. The authors strike a balance between the pure and applied aspects of complex analysis, and present concepts in a clear writing style that is appropriate for students at the junior/senior undergraduate level. Through its comprehensive, student-friendly presentation and numerous applications, the Fifth Edition of this classic text allows students to work through even the most difficult proofs with ease. Believing that mathematicians, engineers, and scientists should be exposed to a careful presentation of mathematics, the authors devote attention to important topics such as ensuring that required assumptions are met before using a theorem, confirming that algebraic operations are valid, and checking that formulas are not blindly applied. A new chapter on z-transforms and applications provides students with a current look at Digital Filter Design and Signal Processing. Key Features: New! Chapter 9 is new to this edition and is dedicated to z-transforms, the math needed for engineering applications such as Digital Filter Design and Signal Processing. The text models good proofs and guides students through the details. Exercise sets offer a wide variety of choices for computational skills, theoretical understanding, and applications. Applications show how complex analysis is used in science and engineering. Illustrations include the z-transform, ideal fluid flow, steady-state temperatures, and electrostatics. Coverage of Julia and Mandelbrot sets. Interactive website includes bibliographical library resources, undergraduate research, and complementary software using F(Z)[Trademark], Mathematica[Trademark], and Maple[Trademark]. Solutions to odd-numbered problem assignments are included as an appendix. Book jacket.

*Linear and Complex Analysis for Applications* - John P. D'Angelo 2017-08-02

Linear and Complex Analysis for Applications aims to unify various parts of mathematical analysis in an engaging manner and to provide a diverse and unusual collection of applications, both to other fields of mathematics and to physics and engineering. The book evolved from several of the author's teaching experiences, his research in complex analysis in several variables, and many conversations with friends and colleagues. It has three primary goals: to develop enough linear analysis and complex variable theory to prepare students in engineering or applied mathematics for advanced work, to unify many distinct and seemingly isolated topics, to show mathematics as both interesting and useful, especially via the juxtaposition of examples and theorems. The book realizes these goals by beginning with reviews of Linear Algebra, Complex Numbers, and topics from Calculus III. As the topics are being reviewed, new material is inserted to help the student develop skill in both computation and theory. The material on linear algebra includes infinite-dimensional examples arising from elementary calculus and differential equations. Line and surface integrals are computed both in the language of classical vector analysis and by using differential forms. Connections among the topics and applications appear throughout the book. The text weaves abstract mathematics, routine computational problems, and applications into a coherent whole, whose unifying theme is linear systems. It includes many unusual examples and contains more than 450 exercises.

*Fundamentals of Complex Analysis Engineering, Science and Mathematics* - E. B. Saff 2013-07-18

This book provides a comprehensive introduction to complex variable theory and its applications to current engineering problems. It is designed to make the fundamentals of the subject more easily accessible to students who have little inclination to wade through the rigors of the axiomatic approach.

**Complex Variables for Scientists and Engineers** - John D. Paliouras 2014-02-20

Outstanding undergraduate text provides a thorough understanding of fundamentals and creates the basis for higher-level courses. Numerous examples and extensive exercise sections of varying difficulty, plus answers to selected exercises. 1990 edition.

**Fundamentals of Complex Analysis for Mathematics, Science, and Engineering** - E. B. Saff 1976

**An Introduction to Complex Analysis** - O. Carruth McGehee 2000-09-15

Recent decades have seen profound changes in the way we understand complex analysis. This new work presents a much-needed modern treatment of the subject, incorporating the latest developments and providing a rigorous yet accessible introduction to the concepts and proofs of this fundamental branch of mathematics. With its thorough review of the prerequisites and well-balanced mix of theory and practice, this book will appeal both to readers interested in pursuing advanced topics as well as those wishing to explore the many applications of complex analysis to engineering and the physical sciences. \* Reviews the necessary calculus, bringing readers quickly up to speed on the material \* Illustrates the theory, techniques, and reasoning through the use of short proofs and many examples \* Demystifies complex versus real differentiability for functions from the plane to the plane \* Develops Cauchy's Theorem, presenting the powerful and easy-to-use winding-number version \* Contains over 100 sophisticated graphics to provide helpful examples and reinforce important concepts

*Complex Analysis and Applications, Second Edition* - Alan Jeffrey 2005-11-10

Complex Analysis and Applications, Second Edition explains complex analysis for students of applied mathematics and engineering. Restructured and completely revised, this textbook first develops the theory of complex analysis, and then examines its geometrical interpretation and application to Dirichlet and Neumann boundary value problems. A discussion of complex analysis now forms the first three chapters of the book, with a description of conformal mapping and its application to boundary value problems for the two-dimensional Laplace equation forming the final two chapters. This new structure enables students to study theory and applications separately, as needed. In order to maintain brevity and clarity, the text limits the application of complex analysis to two-dimensional boundary value problems related to temperature distribution, fluid flow, and electrostatics. In each case, in order to show the relevance of complex analysis, each application is preceded by mathematical background that demonstrates how a real valued potential function and its related complex potential can be derived from the mathematics that describes the physical situation.

**A Collection of Problems on Complex Analysis** - Lev Izrailevich Volkovyski? 1991-01-01

Over 1500 problems on theory of functions of the complex variable; coverage of nearly every branch of classical function theory. Topics include conformal mappings, integrals and power series, Laurent series, parametric integrals, integrals of the Cauchy type, analytic continuation, Riemann surfaces, much more. Answers and solutions at end of text. Bibliographical references. 1965 edition.

*Introductory Complex Analysis* - Richard A. Silverman 1984-05-01

A shorter version of A. I. Markushevich's masterly three-volume Theory of Functions of a Complex Variable, this edition is appropriate for advanced undergraduate and graduate courses in complex analysis. Numerous worked-out examples and more than 300 problems, some with hints and answers, make it suitable for independent study. 1967 edition.

**Complex Analysis with MATHEMATICA®** - William T. Shaw 2006-04-20

This book presents a way of learning complex analysis, using Mathematica. Includes CD with electronic version of the book.

**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.

**A Course in Complex Analysis** - Saeed Zakeri 2021-11-02

"This textbook is intended for a year-long graduate course on complex analysis, a branch of mathematical analysis that has broad applications, particularly in physics, engineering, and applied mathematics. Based on nearly twenty years of classroom lectures, the book is accessible enough for independent study, while the rigorous approach will appeal to more experienced readers and scholars, propelling further research in this field. While other graduate-level complex analysis textbooks do exist, Zakeri takes a distinctive approach by highlighting the geometric properties and topological underpinnings of this area. Zakeri includes more than three hundred and fifty problems, with problem sets at the end of each chapter, along with additional solved examples. Background knowledge of undergraduate analysis and topology is needed, but the thoughtful examples are accessible to beginning graduate students and advanced undergraduates. At the same time, the book has sufficient depth for advanced readers to enhance their own research. The textbook is well-written, clearly illustrated, and peppered with historical information, making it approachable without sacrificing rigor. It is poised to be a valuable textbook for graduate students, filling a needed gap by way of its level and unique approach"--

**An Introduction to Complex Analysis** - Ravi P. Agarwal 2011-07-01

This textbook introduces the subject of complex analysis to advanced undergraduate and graduate students in a clear and concise manner. Key features of this textbook: effectively organizes the subject into easily manageable sections in the form of 50 class-tested lectures, uses detailed examples to drive the presentation, includes numerous exercise sets that encourage pursuing extensions of the material, each with an "Answers or Hints" section, covers an array of advanced topics which allow for flexibility in developing the subject beyond the basics, provides a concise history of complex numbers. An Introduction to Complex Analysis will be valuable to students in mathematics, engineering and other applied sciences. Prerequisites include a course in calculus.

Visual Complex Analysis - Tristan Needham 1997

This radical approach to complex analysis replaces the standard calculational arguments with new geometric ones. Using several hundred diagrams this is a new visual approach to the topic.

Complex Variables with Applications - Saminathan Ponnusamy 2007-05-26

Explores the interrelations between real and complex numbers by adopting both generalization and specialization methods to move between them, while simultaneously examining their analytic and geometric characteristics Engaging exposition with discussions, remarks, questions, and exercises to motivate understanding and critical thinking skills Enclues numerous examples and applications relevant to science and engineering students

Advanced Engineering Mathematics - Michael Greenberg 2013-09-20

Appropriate for one- or two-semester Advanced Engineering Mathematics courses in departments of Mathematics and Engineering. This clear, pedagogically rich book develops a strong understanding of the mathematical principles and practices that today's engineers and scientists need to know. Equally effective as either a textbook or reference manual, it approaches mathematical concepts from a practical-use perspective making physical applications more vivid and substantial. Its comprehensive instructional

framework supports a conversational, down-to-earth narrative style offering easy accessibility and frequent opportunities for application and reinforcement.

**Elementary Real and Complex Analysis** - Georgi E. Shilov 2012-07-31

DIVExcellent undergraduate-level text offers coverage of real numbers, sets, metric spaces, limits, continuous functions, much more. Each chapter contains a problem set with hints and answers. 1973 edition. /div

**Handbook of Complex Analysis** - Steven G. Krantz 2022-03-07

In spite of being nearly 500 years old, the subject of complex analysis is still today a vital and active part of mathematics. There are important applications in physics, engineering, and other aspects of technology. This Handbook presents contributed chapters by prominent mathematicians, including the new generation of researchers. More than a compilation of recent results, this book offers students an essential stepping-stone to gain an entry into the research life of complex analysis. Classes and seminars play a role in this process. More, though, is needed for further study. This Handbook will play that role. This book is also a reference and a source of inspiration for more seasoned mathematicians—both specialists in complex analysis and others who want to acquaint themselves with current modes of thought. The chapters in this volume are authored by leading experts and gifted expositors. They are carefully crafted presentations of diverse aspects of the field, formulated for a broad and diverse audience. This volume is a touchstone for current ideas in the broadly construed subject area of complex analysis. It should enrich the literature and point in some new directions.

Mathematics Of Physics And Engineering - Blum Edward K 2006-07-07

Aimed at scientists and engineers, this book is an exciting intellectual journey through the mathematical worlds of Euclid, Newton, Maxwell, Einstein, and Schrodinger-Dirac. While similar books present the required mathematics in a piecemeal manner with tangential references to the relevant physics and engineering, this textbook serves the interdisciplinary needs of engineers, scientists and applied mathematicians by unifying the mathematics and physics into a single systematic body of knowledge but preserving the rigorous logical development of the mathematics. The authors take an unconventional approach by integrating the mathematics with its motivating physical phenomena and, conversely, by showing how the mathematical models predict new physical phenomena.

**Complex Analysis and Its Applications** - C.C. Yang 1994-04-05

This volume presents a collection of contributions to an international conference on complex analysis and its applications held at the newly founded Hong Kong University of Science and Technology in January 1993. The aim of the conference was to advance the theoretical aspects of complex analysis and to explore the application of its techniques to physical and engineering problems. Three main areas were emphasised: Value distribution theory; Complex dynamical system and geometric function theory; and the Application of complex analysis to differential quations and physical engineering problems.

Complex Analysis with Applications in Science and Engineering - Harold Cohen 2007-10-18

The Second Edition of this acclaimed text helps you apply theory to real-world applications in mathematics, physics, and engineering. It easily guides you through complex analysis with its excellent coverage of topics such as series, residues, and the evaluation of integrals; multi-valued functions; conformal mapping; dispersion relations; and analytic continuation. Worked examples plus a large number of assigned problems help you understand how to apply complex concepts and build your own skills by putting them into practice. This edition features many new problems, revised sections, and an entirely new chapter on analytic continuation.

**Complex Variables and the Laplace Transform for Engineers** - Wilbur R. LePage 2012-04-26

Acclaimed text on engineering math for graduate students covers theory of complex variables, Cauchy-Riemann equations, Fourier and Laplace transform theory, Z-transform, and much more. Many excellent problems.

**Complex Analysis for Mathematics and Engineering** - John H. Mathews 2010-12-17

Intended for the undergraduate student majoring in mathematics, physics or engineering, the Sixth Edition of Complex Analysis for Mathematics and Engineering continues to provide a comprehensive, student-friendly presentation of this interesting area of mathematics. The authors strike a balance between the pure

and applied aspects of the subject, and present concepts in a clear writing style that is appropriate for students at the junior/senior level. Through its thorough, accessible presentation and numerous applications, the sixth edition of this classic text allows students to work through even the most difficult proofs with ease. New exercise sets help students test their understanding of the material at hand and assess their progress through the course. Additional Mathematica and Maple exercises, as well as a student study guide are also available online.

*Mathematical Analysis for Engineers* - Bernard Dacorogna 2012-06-18

This book follows an advanced course in analysis (vector analysis, complex analysis and Fourier analysis) for engineering students, but can also be useful, as a complement to a more theoretical course, to mathematics and physics students. The first three parts of the book represent the theoretical aspect and are independent of each other. The fourth part gives detailed solutions to all exercises that are proposed in the first three parts. Foreword Foreword (71 KB) Sample Chapter(s) Chapter 1: Differential Operators of Mathematical Physics (272 KB) Chapter 9: Holomorphic functions and Cauchy-Riemann equations (248 KB) Chapter 14: Fourier series (281 KB) Request Inspection Copy Contents: Vector Analysis:Differential Operators of Mathematical PhysicsLine IntegralsGradient Vector FieldsGreen TheoremSurface IntegralsDivergence TheoremStokes TheoremAppendixComplex Analysis:Holomorphic Functions and Cauchy-Riemann EquationsComplex IntegrationLaurent SeriesResidue Theorem and ApplicationsConformal MappingFourier Analysis:Fourier SeriesFourier TransformLaplace TransformApplications to Ordinary Differential EquationsApplications to Partial Differential EquationsSolutions to the Exercises:Differential Operators of Mathematical PhysicsLine IntegralsGradient Vector FieldsGreen TheoremSurface IntegralsDivergence TheoremStokes TheoremHolomorphic Functions and Cauchy-Riemann EquationsComplex IntegrationLaurent SeriesResidue Theorem and ApplicationsConformal MappingFourier SeriesFourier TransformLaplace TransformApplications to Ordinary Differential EquationsApplications to Partial Differential Equations Readership: Undergraduate students in analysis & differential equations, complex analysis, civil, electrical and mechanical engineering.

**Complex Analysis for Mathematics and Engineering** - John H. Mathews 1996

This text provides a balance between pure (theoretical) and applied aspects of complex analysis. The many applications of complex analysis to science and engineering are described, and this third edition contains a historical introduction depicting the origins of complex numbers.

*A MatLab® Companion to Complex Variables* - A. David Wunsch 2018-09-03

This book is intended for someone learning functions of a complex variable and who enjoys using MATLAB. It will enhance the experience of learning complex variable theory and will strengthen the knowledge of someone already trained in this branch of advanced calculus. ABET, the accrediting board for engineering programs, makes it clear that engineering graduates must be skilled in the art of programming in a language such as MATLAB®. Supplying students with a bridge between the functions of complex variable theory and MATLAB, this supplemental text enables instructors to easily add a MATLAB component to their complex variables courses. A MATLAB® Companion to Complex Variables provides readers with a clear understanding of the utility of MATLAB in complex variable calculus. An ideal adjunct to standard texts on the functions of complex variables, the book allows professors to quickly find and assign MATLAB programming problems that will strengthen students' knowledge of the language and concepts of complex variable theory. The book shows students how MATLAB can be a powerful learning aid in such staples of complex variable theory as conformal mapping, infinite series, contour integration, and Laplace and Fourier transforms. In addition to MATLAB programming problems, the text includes many examples in each chapter along with MATLAB code. Fractals, the most recent interesting topic involving complex variables, demands to be treated with a language such as MATLAB. This book concludes with a Coda, which is devoted entirely to this visually intriguing subject. MATLAB is not without constraints, limitations, irritations, and quirks, and there are subtleties involved in performing the calculus of complex variable theory with this language. Without knowledge of these subtleties, engineers or scientists attempting to use MATLAB for solutions of practical problems in complex variable theory suffer the risk of making major mistakes. This book serves as an early warning system about these pitfalls.

**Modern Engineering Mathematics** - Abul Hasan Siddiqi 2017-12-22

This book is a compendium of fundamental mathematical concepts, methods, models, and their wide range of applications in diverse fields of engineering. It comprises essentially a comprehensive and contemporary coverage of those areas of mathematics which provide foundation to electronic, electrical, communication, petroleum, chemical, civil, mechanical, biomedical, software, and financial engineering. It gives a fairly extensive treatment of some of the recent developments in mathematics which have found very significant applications to engineering problems.

Mathematical Methods for Engineers and Scientists 1 - Kwong-Tin Tang 2022-10-25

The topics of this set of student-oriented books are presented in a discursive style that is readable and easy to follow. Numerous clearly stated, completely worked out examples together with carefully selected problem sets with answers are used to enhance students' understanding and manipulative skill. The goal is to help students feel comfortable and confident in using advanced mathematical tools in junior, senior, and beginning graduate courses.

**Complex Variables: Harmonic and Analytic Functions** - Francis J. Flanigan 1972

**Complex Analysis for Mathematics and Engineering** - John Mathews 2012

Intended for the undergraduate student majoring in mathematics, physics or engineering, the Sixth Edition of Complex Analysis for Mathematics and Engineering continues to provide a comprehensive, student-friendly presentation of this interesting area of mathematics. The authors strike a balance between the pure and applied aspects of the subject, and present concepts in a clear writing style that is appropriate for students at the junior/senior level. Through its thorough, accessible presentation and numerous applications, the sixth edition of this classic text allows students to work through even the most difficult proofs with ease. New exercise sets help students test their understanding of the material at hand and assess their progress through the course. Additional Mathematica and Maple exercises, as well as a student study guide are also available online.

**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.

*Fundamentals of Complex Analysis with Applications to Engineering and Science* - E. B. Saff 2003

Providing a comprehensive introduction to complex variable theory and its applications to engineering problems, this text is designed to make the subject matter more accessible to students.

Fundamentals of Complex Analysis with Applications to Engineering and Science - E. B. Saff 2003

This is the best seller in this market. It provides a comprehensive introduction to complex variable theory and its applications to current engineering problems. It is designed to make the fundamentals of the subject more easily accessible to students who have little inclination to wade through the rigors of the axiomatic approach. Modeled after standard calculus books both in level of exposition and layout it incorporates

physical applications throughout the presentation, so that the mathematical methodology appears less sterile to engineering students.

**Complex Analysis** - Andrei Bourchtein 2021

This book discusses all the major topics of complex analysis, beginning with the properties of complex numbers and ending with the proofs of the fundamental principles of conformal mappings. Topics covered in the book include the study of holomorphic and analytic functions, classification of singular points and the Laurent series expansion, theory of residues and their application to evaluation of integrals, systematic study of elementary functions, analysis of conformal mappings and their applications--making this book self-sufficient and the reader independent of any other texts on complex variables. The book is aimed at the advanced undergraduate students of mathematics and engineering, as well as those interested in studying complex analysis with a good working knowledge of advanced calculus. The mathematical level of the exposition corresponds to advanced undergraduate courses of mathematical analysis and first graduate introduction to the discipline. The book contains a large number of problems and exercises, making it suitable for both classroom use and self-study. Many standard exercises are included in each section to develop basic skills and test the understanding of concepts. Other problems are more theoretically oriented and illustrate intricate points of the theory. Many additional problems are proposed as homework tasks whose level ranges from straightforward, but not overly simple, exercises to problems of considerable difficulty but of comparable interest.

**Contributions in Mathematics and Engineering** - Panos M. Pardalos 2016-10-04

The contributions in this volume aim to deepen understanding of some of the current research problems and theories in modern topics such as calculus of variations, optimization theory, complex analysis, real analysis, differential equations, and geometry. Applications to these areas of mathematics are presented within the broad spectrum of research in Engineering Science with particular emphasis on equilibrium problems, complexity in numerical optimization, dynamical systems, non-smooth optimization, complex network analysis, statistical models and data mining, and energy systems. Additional emphasis is given to interdisciplinary research, although subjects are treated in a unified and self-contained manner. The presentation of methods, theory and applications makes this tribute an invaluable reference for teachers, researchers, and other professionals interested in pure and applied research, philosophy of mathematics, and mathematics education. Some review papers published in this volume will be particularly useful for a broader audience of readers as well as for graduate students who search for the latest information. Constantin Carathéodory's wide-ranging influence in the international mathematical community was seen during the first Fields Medals awards at the International Congress of Mathematicians, Oslo, 1936. Two medals were awarded, one to Lars V. Ahlfors and one to Jesse Douglass. It was Carathéodory who presented both their works during the opening of the International Congress. This volume contains significant papers in Science and Engineering dedicated to the memory of Constantin Carathéodory and the spirit of his mathematical influence.

**A Complex Analysis Problem Book** - Daniel Alpay 2016-10-26

This second edition presents a collection of exercises on the theory of analytic functions, including completed and detailed solutions. It introduces students to various applications and aspects of the theory of analytic functions not always touched on in a first course, while also addressing topics of interest to electrical engineering students (e.g., the realization of rational functions and its connections to the theory of linear systems and state space representations of such systems). It provides examples of important Hilbert spaces of analytic functions (in particular the Hardy space and the Fock space), and also includes a section reviewing essential aspects of topology, functional analysis and Lebesgue integration. Benefits of the 2nd edition Rational functions are now covered in a separate chapter. Further, the section on conformal mappings has been expanded.

*Complex Analysis with Applications* - Nakhlé H. Asmar 2018-10-12

This textbook is intended for a one semester course in complex analysis for upper level undergraduates in mathematics. Applications, primary motivations for this text, are presented hand-in-hand with theory enabling this text to serve well in courses for students in engineering or applied sciences. The overall aim in designing this text is to accommodate students of different mathematical backgrounds and to achieve a balance between presentations of rigorous mathematical proofs and applications. The text is adapted to enable maximum flexibility to instructors and to students who may also choose to progress through the material outside of coursework. Detailed examples may be covered in one course, giving the instructor the option to choose those that are best suited for discussion. Examples showcase a variety of problems with completely worked out solutions, assisting students in working through the exercises. The numerous exercises vary in difficulty from simple applications of formulas to more advanced project-type problems. Detailed hints accompany the more challenging problems. Multi-part exercises may be assigned to individual students, to groups as projects, or serve as further illustrations for the instructor. Widely used graphics clarify both concrete and abstract concepts, helping students visualize the proofs of many results. Freely accessible solutions to every-other-odd exercise are posted to the book's Springer website. Additional solutions for instructors' use may be obtained by contacting the authors directly.

**Advanced Mathematics for Engineering Students** - Brent J. Lewis 2021-05-20

Advanced Mathematics for Engineering Students: The Essential Toolbox provides a concise treatment for applied mathematics. Derived from two semester advanced mathematics courses at the author's university, the book delivers the mathematical foundation needed in an engineering program of study. Other treatments typically provide a thorough but somewhat complicated presentation where students do not appreciate the application. This book focuses on the development of tools to solve most types of mathematical problems that arise in engineering - a "toolbox" for the engineer. It provides an important foundation but goes one step further and demonstrates the practical use of new technology for applied analysis with commercial software packages (e.g., algebraic, numerical and statistical). Delivers a focused and concise treatment on the underlying theory and direct application of mathematical methods so that the reader has a collection of important mathematical tools that are easily understood and ready for application as a practicing engineer. The book material has been derived from class-tested courses presented over many years in applied mathematics for engineering students (all problem sets and exam questions given for the course(s) are included along with a solution manual) Provides fundamental theory for applied mathematics while also introducing the application of commercial software packages as modern tools for engineering application, including: EXCEL (statistical analysis); MAPLE (symbolic and numeric computing environment); and COMSOL (finite element solver for ordinary and partial differential equations)

*An Introduction to Complex Analysis and the Laplace Transform* - Vladimir Eiderman 2021-12-20

The aim of this comparatively short textbook is a sufficiently full exposition of the fundamentals of the theory of functions of a complex variable to prepare the student for various applications. Several important applications in physics and engineering are considered in the book. This thorough presentation includes all theorems (with a few exceptions) presented with proofs. No previous exposure to complex numbers is assumed. The textbook can be used in one-semester or two-semester courses. In one respect this book is larger than usual, namely in the number of detailed solutions of typical problems. This, together with various problems, makes the book useful both for self-study and for the instructor as well. A specific point of the book is the inclusion of the Laplace transform. These two topics are closely related. Concepts in complex analysis are needed to formulate and prove basic theorems in Laplace transforms, such as the inverse Laplace transform formula. Methods of complex analysis provide solutions for problems involving Laplace transforms. Complex numbers lend clarity and completion to some areas of classical analysis. These numbers found important applications not only in the mathematical theory, but in the mathematical descriptions of processes in physics and engineering.