Zorich Mathematical Analysis

Real Analysis: Measures, Integrals and Applications is devoted to the basics of integration theory and its related topics. The main emphasis is made on the properties of the Lebesgue integral and various applications both classical and those rarely covered in literature. This book provides a detailed introduction to Lebesgue measure and integration as well as the classical results concerning integrals of multivariable functions. It examines the concept of the Hausdorff measure, the properties of the area on smooth and Lipschitz surfaces, the divergence formula, and Laplace's method for finding the asymptotic behavior of integrals. The general theory is then applied to harmonic analysis, geometry, and topology. Preliminaries are provided on probability theory, including the study of the Rademacher functions as a sequence of independent random variables. The book contains more than 600 examples and exercises. The reader who has mastered the first third of the book will be able to study other areas of mathematics that use integration, such as probability theory, statistics, functional analysis, partial probability theory, statistics, functional analysis, partial differential equations and others. Real Analysis: Measures, Integrals and Applications is intended for advanced undergraduate and graduate students in mathematics and physics. It assumes that the reader is familiar with basic linear algebra and differential calculus of functions of several variables.

Providing students with an introduction to the fundamentals of analysis, this book continues to present the fundamental concepts of analysis in as painless a manner as possible. To achieve this aim, the second edition has made many improvements in exposition.

Real Analysis is a comprehensive introduction to this core subject and is ideal for self-study or as a course textbook for first and second-year undergraduates. Combining an informal style with precision mathematics, the book covers all the key topics with fully worked examples and exercises with solutions. All the concepts and techniques are deployed in examples in the final chapter to provide the student with a thorough understanding of this challenging subject. This book offers a fresh approach to a core subject and manages to provide a gentle and clear introduction without sacrificing rigour or accuracy.

The Fundamentals of Mathematical Analysis, Volume 1 is a textbook that provides a systematic and rigorous treatment of the fundamentals of mathematical analysis. Emphasis is placed on the concept of limit which plays a principal role in mathematical analysis. Examples of the application of mathematical analysis to geometry, mechanics, physics, and engineering are given. This volume is comprised of 14 chapters and begins with a discussion on real numbers, their properties and applications, and arithmetical operations over real numbers. The reader is then introduced to the concept of function, important classes of functions, and functions of one variable; the theory of limits and the limit of a function, monotonic functions, and the principle of convergence; and continuous functions of one variable. A systematic account of the differential and integral calculus is then presented, paying particular attention to differentiation of functions of one variable; investigation of the behavior of functions by means of derivatives; functions of several variables; and differentiation of functions of several variables. The remaining chapters focus on the concept of a primitive function (and of an indefinite integral); definite integral; geometric applications of integral and differential calculus. This book is intended for first- and second-year mathematics students.

This textbook offers an extensive list of completely solved problems in mathematical analysis. This first of three volumes covers sets, functions, limits, derivatives, integrals, sequences and series, to name a few. The series contains the material corresponding to the first three or four semesters of a course in Mathematical Analysis. Based on the author’s years of teaching experience, this work stands out by providing detailed solutions (often several pages long) to the problems. The basic premise of the book is that no topic should be left unexplained, and no question that could realistically arise while studying the solutions should remain unanswered.

The style and format are straightforward and accessible. In addition, each chapter includes exercises for students to work on independently. Answers are provided to all problems, allowing students to check their work. Though chiefly intended for early undergraduate students of Mathematics, Physics and Engineering, the book will also appeal to students from other areas with an interest in Mathematical Analysis, either as supplementary reading or for independent study.

Contributions to Analysis: A Collection of Papers Dedicated to Lipman Bers is a compendium of papers provided by Bers, friends, students, colleagues, and professors. These papers deal with Teichmuller spaces, Kleinian groups, theta functions, algebraic geometry. Other papers discuss quasiconformal mappings, function theory, differential equations, and differential topology. One paper discusses the results of the rigidity theorem of Mostow and its generalization by Marden in relation to geometric properties of Kleinian groups of the first kind. These results, obtained by planar methods, are presented in terms of the hyperbolic 3-space language, which is a natural pedestal in approaching the action of the Kleinian groups. Another paper reviews Riemann's vanishing theorem which solves the Jacobi inversion problem, by relating the vanishing properties of the theta function (particularly at half periods) to properties of certain linear series on the Riemann surface. One paper examines the problem of obtaining relations among the periods of the differentials of first kind on a compact Riemann surface. An application of a computer program involves supersonic transport. The program is based on the hodograph transformation and a method of complex characteristics to calculate profiles that are shock-less at a specified angle of attack, or at a specified subsonic free-stream Mach number. The collection can prove useful for engineers, statisticians, students, and professors in advance mathematics or courses related to aeronautics.

The second volume expounds classical analysis as it is today, as a part of unified mathematics, and its interactions with modern mathematical courses such as algebra, differential geometry, differential equations, complex and functional analysis. The book provides a firm foundation for advanced work in any of these directions.

The third edition of this well known text continues to provide a solid foundation in mathematical analysis for undergraduate and first-year graduate students. The text begins with a discussion of the real number system as a complete ordered field. (Dedekind's construction is now treated in an appendix to Chapter I.) The topological background needed for the development of convergence, continuity, differentiation and integration is provided in Chapter 2. There is a new section on the gamma function, and many new and interesting exercises are included. This text is part of the Walter Rudin Student Series in Advanced Mathematics.

This book takes the reader on a journey through the world of college mathematics, focusing on some of the most important concepts and results in the theories of polynomials, linear algebra, real analysis, differential equations, coordinate geometry, trigonometry, elementary number theory, combinatorics, and probability. Preliminary material provides an overview of common methods of proof: argument by contradiction, mathematical induction, pigeonhole principle, ordered sets, and invariants. Each chapter systematically presents a single subject within which problems are clustered in each section according to the specific topic. The exposition is driven by nearly 1300 problems and examples chosen from numerous sources from around the world; many original contributions come from the authors. The source, author, and historical background are cited whenever possible. Complete solutions to all problems are given at the end of the book. This second edition includes new sections on quad ratic polynomials, curves in the plane, quadratic fields, combinatorics of numbers, and graph theory, and added problems or theoretical expansion of sections on polynomials, matrices, abstract algebra, limits of sequences and functions, derivatives and their applications, Stokes' theorem, analytical geometry, combinatorial geometry, and counting strategies. Using the W.L. Putnam Mathematical Competition for undergraduates as an inspiring symbol to build an appropriate math background for graduate studies in pure or applied mathematics, the reader is eased into transitioning from problem-solving at the high school level to the university and beyond, that is, to mathematical research. This work may be used as a study guide for the Putnam exam, as a text for many different problem-solving courses, and as a source of problems for standard courses in undergraduate mathematics. Putnam and Beyond is organized for independent study by undergraduate and gradu ate students, as well as teachers and researchers in the physical sciences who wish to expand their mathematical horizons.

This new, revised edition covers all of the basic topics in calculus of several variables, including vectors, curves, functions of several variables, gradient, tangent plane, maxima and minima, potential functions, curve integrals, Green's theorem, multiple integrals, surface integrals, Stokes' theorem, and the inverse mapping theorem and its consequences. It includes many completely worked-out problems.

Mathematical Analysis ISpringer Science & Business Media

This work by Zorich on Mathematical Analysis constitutes a thorough first course in real analysis, leading from the most elementary facts about real numbers to such advanced topics as differential forms on manifolds, asymptotic methods, Fourier, Laplace, and Legendre transforms, and elliptic functions.

An authorised reissue of the long out of print classic textbook, Advanced Calculus by the late Dr Lynn Loomis and Dr Shlomo Sternberg both of Harvard University has been a revered but hard to find textbook for the advanced calculus course for decades. This book is based on an honors course in advanced calculus that the authors gave in the 1960's. The foundational material, presented in the unstarred sections of Chapters 1 through 11, was normally covered, but different applications of this basic material were stressed from year to year, and the book therefore contains more material than was covered in any one year. It can accordingly be used (with omissions) as a text for a year's course in advanced calculus, or as a text for a three-semester introduction to analysis. The prerequisites are a good grounding in the calculus of one variable from a mathematically rigorous point of view, together with some acquaintance with linear algebra. The reader should be familiar with limit and continuity type arguments and have a certain amount of mathematical sophistication. As possible introductory texts, we mention Differential and Integral Calculus by R Courant, Calculus by T Apostol, Calculus by M Spivak, and Pure Mathematics by G Hardy. The reader should also have some experience with partial derivatives. In overall plan the book divides roughly into a first half which develops the calculus (principally the differential calculus) in the setting of normed vector spaces, and a second half which deals with the calculus of differentiable manifolds.

This textbook, written by a dedicated and successful pedagogue who developed the present undergraduate algebra course at Moscow State University, differs in several respects from other algebra textbooks available in English. The book reflects the Soviet approach to teaching mathematics with its emphasis on applications and problem-solving -- note that the mathematics department in Moscow is called the I~echanics-Mathematics" Faculty. In the first place, Kostrikin's textbook motivates many of the algebraic concepts by practical examples, for instance, the heated plate problem used to introduce linear equations in Chapter 1. In the second place, there are a large number of exercises, so that the student can convert a vague passive understanding to active mastery of the new ideas. Thes~ problems are intended to be challenging but doable by the student; the harder ones have hints at the back of the book. This feature also makes the book ideally suited for learning algebra on one's own outside of the framework of an organized course. In the third place, the author treats material which is usually not part of an elementary course but which is fundamental in applications. Thus, Part II includes an introduction to the classical groups and to representation theory. With many American colleges now trying to bring their undergraduate mathematics curriculum closer to applications, it seems worthwhile to translate Soviet textbooks which reflect their greater experience in this area of mathematical pedagogy.

This textbook offers a comprehensive undergraduate course in real analysis in one variable. Taking the view that analysis can only be properly appreciated as a rigorous theory, the book recognises the difficulties that students experience when encountering this theory for the first time, carefully addressing them throughout. Historically, it was the precise description of real numbers and the correct definition of limit that placed analysis on a solid foundation. The book therefore begins with these crucial ideas and the fundamental notion of sequence. Infinite series are then introduced, followed by the key concept of continuity. These lay the groundwork for differential and integral calculus, which are carefully covered in the following chapters. Pointers for further study are included throughout the book, and for the more adventurous there is a selection of "nuggets", exciting topics not commonly discussed at this level. Examples of nuggets include Newton's method, the irrationality of ?, Bernoulli numbers, and the Gamma function. Based on decades of teaching experience, this book is written with the undergraduate student in mind. A large number of exercises, many with hints, provide the practice necessary for learning, while the included "nuggets" provide opportunities to deepen understanding and broaden horizons.

Written for junior and senior undergraduates, this remarkably clear and accessible treatment covers set theory, the real number system, metric spaces, continuous functions, Riemann integration, multiple integrals, and more. 1968 edition.

Translated from the Russian by E.J.F. Primrose "Remarkable little book." -SIAM REVIEW V.I. Arnold, who is renowned for his lively style, retraces the beginnings of mathematical analysis and theoretical physics in the works (and the intrigues!) of the great scientists of the 17th century. Some of Huygens' and Newton's ideas. several centuries ahead of their time, were developed only recently. The author follows the link between their inception and the breakthroughs in contemporary mathematics and physics. The book provides present-day generalizations of Newton's theorems on the elliptical shape of orbits and on the transcendence of abelian integrals; it offers a brief review of the theory of regular and chaotic movement in celestial mechanics, including the problem of ports in the distribution of smaller planets and a discussion of the structure of planetary rings.

This elementary presentation exposes readers to both the process of rigor and the rewards inherent in taking an axiomatic approach to the study of functions of a real variable. The aim is to challenge and improve mathematical intuition rather than to verify it. The philosophy of this book is to focus attention on questions which give analysis its inherent fascination. Each chapter begins with the discussion of some motivating examples and concludes with a series of questions.

The Book Is Intended To Serve As A Text In Analysis By The Honours And Post-Graduate Students Of The Various Universities. Professional Or Those Preparing For Competitive Examinations Will Also Find This Book Useful.The Book Discusses The Theory From Its Very Beginning. The Foundations Have Been Laid Very Carefully And The Treatment Is Rigorous And On Modem Lines. It Opens With A Brief Outline Of The Essential Properties Of Rational Numbers And Using Dedekinds Cut, The Properties Of Real Numbers Are Established. This Foundation Supports The Subsequent Chapters: Topological Frame Work

Real Sequences And Series, Continuity Differentiation, Functions Of Several Variables, Elementary And Implicit Functions, Riemann And Riemann-Stieltjes Integrals, Lebesgue Integrals, Surface, Double And Triple Integrals Are Discussed In Detail. Uniform Convergence, Power Series, Fourier Series, Improper Integrals Have Been Presented In As Simple And Lucid Manner As Possible And Fairly Large Number Solved Examples To Illustrate Various Types Have Been Introduced.As Per Need, In The Present Set Up, A Chapter On Metric Spaces Discussing Completeness, Compactness And Connectedness Of The Spaces Has Been Added. Finally Two Appendices Discussing Beta-Gamma Functions, And Cantors Theory Of Real Numbers Add Glory To The Contents Of The Book.

Was plane geometry your favourite math course in high school? Did you like proving theorems? Are you sick of memorising integrals? If so, real analysis could be your cup of tea. In contrast to calculus and elementary algebra, it involves neither formula manipulation nor applications to other fields of science. None. It is Pure Mathematics, and it is sure to appeal to the budding pure mathematician. In this new introduction to undergraduate real analysis the author takes a different approach from past studies of the subject, by stressing the importance of pictures in mathematics and hard problems. The exposition is informal and relaxed, with many helpful asides, examples and occasional comments from mathematicians like Dieudonne, Littlewood and Osserman. The author has taught the subject many times over the last 35 years at Berkeley and this book is based on the honours version of this course. The book contains an excellent selection of more than 500 exercises.

A signi?cant sector of the development of spectral theory outside the classical area of Hilbert space may be found amongst at multipliers de?ned on a complex commutative Banach algebra A. Although the general theory of multipliers for abstract Banach algebras has been widely investigated by several authors, it is surprising how rarely various aspects of the spectral theory, for instance Fredholm theory and Riesz theory, of these important classes of operators have been studied. This scarce consideration is even more surprising when one observes that the various aspects of spectral t- ory mentioned above are quite similar to those of a normal operator de?ned on a complex Hilbert space. In the last ten years the knowledge of the spectral properties of multip- ers of Banach algebras has increased considerably, thanks to the researches undertaken by many people working in local spectral theory and Fredholm theory. This research activity recently culminated with the publication of the book of Laursen and Neumann [214], which collects almost every thing that is known about the spectral theory of multipliers.

Multivariable Mathematics combines linear algebra and multivariable mathematics in a rigorous approach. The material is integrated to emphasize the recurring theme of implicit versus explicit that persists in linear algebra and analysis. In the text, the author includes all of the standard computational material found in the usual linear algebra and multivariable calculus courses, and more, interweaving the material as effectively as possible, and also includes complete proofs. * Contains plenty of examples, clear proofs, and significant motivation for the crucial concepts. * Numerous exercises of varying levels of difficulty, both computational and more proof-oriented. * Exercises are arranged in order of increasing difficulty.

This is part two of a two-volume book on real analysis and is intended for senior undergraduate students of mathematics who have already been exposed to calculus. The emphasis is on rigour and foundations of analysis. Beginning with the construction of the number systems and set theory, the book discusses the basics of analysis (limits, series, continuity, differentiation, Riemann integration), through to power series, several variable calculus and Fourier analysis, and then finally the Lebesgue integral. These are almost entirely set in the concrete setting of the real line and Euclidean spaces, although there is some material on abstract metric and topological spaces. The book also has appendices on mathematical logic and the decimal system. The entire text (omitting some less central topics) can be taught in two quarters of 25–30 lectures each. The course material is deeply intertwined with the exercises, as it is intended that the student actively learn the material (and practice thinking and writing rigorously) by proving several of the key results in the theory.

This text is a rigorous, detailed introduction to real analysis that presents the fundamentals with clear exposition and carefully written definitions, theorems, and proofs. It is organized in a distinctive, flexible way that would make it equally appropriate to undergraduate mathematics majors who want to continue in mathematics, and to future mathematics teachers who want to understand the theory behind calculus. The Real Numbers and Real Analysis will serve as an excellent one-semester text for undergraduates majoring in mathematics, and for students in mathematics education who want a thorough understanding of the theory behind the real number system and calculus.

Based on a two-semester course aimed at illustrating various interactions of "pure mathematics" with other sciences, such as hydrodynamics, thermodynamics, statistical physics and information theory, this text unifies three general topics of analysis and physics, which are as follows: the dimensional analysis of physical quantities, which contains various applications including Kolmogorov's model for turbulence; functions of very large number of variables and the principle of concentration along with the non-linear law of large numbers, the geometric meaning of the Gauss and Maxwell distributions, and the Kotelnikov-Shannon theorem; and, finally, classical thermodynamics and contact geometry, which covers two main principles of thermodynamics in the language of differential forms, contact distributions, the Frobenius theorem and the Carnot-Caratheodory metric. It includes problems, historical remarks, and Zorich's popular article, "Mathematics as language and method."

This is part one of a two-volume book on real analysis and is intended for senior undergraduate students of mathematics who have already been exposed to calculus. The emphasis is on rigour and foundations of analysis. Beginning with the construction of the number systems and set theory, the book discusses the basics of analysis (limits, series, continuity, differentiation, Riemann integration), through to power series, several variable calculus and Fourier analysis, and then finally the Lebesgue integral. These are almost entirely set in the concrete setting of the real line and Euclidean spaces, although there is some material on abstract metric and topological spaces. The book also has appendices on mathematical logic and the decimal system. The entire text (omitting some less central topics) can be taught in two quarters of 25–30 lectures each. The course material is deeply intertwined with the exercises, as it is intended that the student actively learn the material (and practice thinking and writing rigorously) by proving several of the key results in the theory.

The purpose of the volume is to provide a support for a first course in Mathematics. The contents are organised to appeal especially to Engineering, Physics and Computer Science students, all areas in which mathematical tools play a crucial role. Basic notions and methods of differential and integral calculus for functions of one real variable are presented in a manner that elicits critical reading and prompts a hands-on approach to concrete applications. The layout has a specifically-designed modular nature, allowing the instructor to make flexible didactical choices when planning an introductory lecture course. The book may in fact be employed at three levels of depth. At the elementary level the student is supposed to grasp the very essential ideas and familiarise with the corresponding key techniques. Proofs to the main results befit the intermediate level, together with several remarks and complementary notes enhancing the treatise. The last, and farthest-reaching, level requires the additional study of the material contained in the appendices, which enable the strongly motivated reader to explore further into the subject. Definitions and properties are furnished with substantial examples to stimulate the learning process. Over 350 solved exercises complete the text, at least half of which guide the reader to the solution. This new edition features additional material with the aim of matching the widest range of educational choices for a first course of Mathematics.

There are many mathematics textbooks on real analysis, but they focus on topics not readily helpful for studying economic theory or they are inaccessible to most graduate students of economics. Real Analysis with Economic Applications aims to fill this gap by providing an ideal textbook and reference on real analysis tailored specifically to the concerns of such students. The emphasis throughout is on topics directly relevant to economic theory. In addition to addressing the usual topics of real analysis, this book discusses the elements of order theory, convex analysis, optimization, correspondences, linear and nonlinear functional analysis, fixed-point theory, dynamic programming, and calculus of variations. Efe Ok complements the mathematical development with applications that provide concise introductions to various topics from economic theory, including individual decision theory and games, welfare economics, information theory, general equilibrium and finance, and intertemporal economics. Moreover, apart from direct applications to economic theory, his book includes numerous fixed point theorems and applications to functional equations and optimization theory. The book is rigorous, but accessible to those who are relatively new to the ways of real analysis. The formal exposition is accompanied by discussions that describe the basic ideas in relatively heuristic terms, and by more than 1,000 exercises of varying difficulty. This book will be an indispensable resource in courses on mathematics for economists and as a reference for graduate students working on economic theory.

The Way of Analysis gives a thorough account of real analysis in one or several variables, from the construction of the real number system to an introduction of the Lebesgue integral. The text provides proofs of all main results, as well as motivations, examples, applications, exercises, and formal chapter summaries. Additionally, there are three chapters on application of analysis, ordinary differential equations, Fourier series, and curves and surfaces to show how the techniques of analysis are used in concrete settings.

"The three volumes of A Course in Mathematical Analysis provide a full and detailed account of all those elements of real and complex analysis that an undergraduate mathematics student can expect to encounter in their first two or three years of study. Containing hundreds of exercises, examples and applications, these books will become an invaluable resource for both students and instructors. Volume I focuses on the analysis of real-valued functions of a real variable. Besides developing the basic theoryit describes many applications, including a chapter on Fourier series. It also includes a Prologue in which the author introduces the axioms of set theory and uses them to construct the real number system. Volume II goes on to consider metric and topological spaces, and functions of several variables. Volume III covers complex analysis and the theory of measure and integration"--

This book is an introduction to mathematical analysis (i.e real analysis) at a fairly elementary level. A great (unusual) emphasis is given to the construction of rational and then of real numbers, using the method of equivalence classes and of Cauchy sequences. The text includes the usual presentation of: sequences of real numbers, infinite numerical series, continuous functions, derivatives and Riemann-Darboux integration. There are also two “special” sections: on convex functions and on metric spaces, as well as an elementary appendix on Logic, Set Theory and Functions. We insist on a rigorous presentation throughout in the framework of the classical, standard, analysis. Contents: NumbersSequences of Real NumbersInfinite Numerical SeriesContinuous FunctionsDerivativesConvex FunctionsMetric SpacesIntegrationIndexIndex of NotationsAppendix (Logic, Set Theory and Functions)Bibliography Readership: Undergraduate students of calculus and real analysis. keywords:Numbers;Sequences;Series;Continuous Functions;Derivatives;Convex Functions;Metric Spaces;Integration

The purpose of this textbook is to present an array of topics in Calculus, and conceptually follow our previous effort Mathematical Analysis I.The present material is partly found, in fact, in the syllabus of the typical second lecture course in Calculus as offered in most Italian universities. While the subject matter known as `Calculus 1' is more or less standard, and concerns real functions of real variables, the topics of a course on `Calculus 2'can vary a lot, resulting in a bigger flexibility. For these reasons the Authors tried to cover a wide range of subjects, not forgetting that the number of credits the current programme specifications confers to a second Calculus course is not comparable to the amount of content gathered here. The reminders disseminated in the text make the chapters more independent from one another, allowing the reader to jump back and forth, and thus enhancing the versatility of the book. On the website: http://calvino.polito.it/canuto-tabacco/analisi 2, the interested reader may find the

rigorous explanation of the results that are merely stated without proof in the book, together with useful additional material. The Authors have completely omitted the proofs whose technical aspects prevail over the fundamental notions and ideas. The large number of exercises gathered according to the main topics at the end of each chapter should help the student put his improvements to the test. The solution to all exercises is provided, and very often the procedure for solving is outlined.
Comprehensive, elementary introduction to real and functional analysis covers basic concepts and introductory principles in set theory, metric spaces, topological and linear spaces, linear functionals and linear operators, more. 1970 edition.
Topology continues to be a topic of prime importance in contemporary mathematics, but until the publication of this book there were few if any introductions to topology for undergraduates. This book remedied that need by offering a carefully thought-out, graduated approach to point set topology at the undergraduate level. To make the book as accessible as possible, the author approaches topology from a geometric and axiomatic standpoint; geometric, because most students come to the subject with a good deal of geometry behind them, enabling them to use their geometric intuition; axiomatic, because it parallels the student's experience with modern algebra, and keeps the book in harmony with current trends in mathematics. After a discussion of such preliminary topics as the algebra of sets, Euler-Venn diagrams and infinite sets, the author takes up basic definitions and theorems regarding topological spaces (Chapter 1). The second chapter deals with continuous functions (mappings) and homeomorphisms, followed by two chapters on special types of topological spaces (varieties of compactness and varieties of connectedness). Chapter 5 covers metric spaces. Since basic point set topology serves as a foundation not only for functional analysis but also for more advanced work in point set topology and algebraic topology, the author has included topics aimed at students with interests other than analysis. Moreover, Dr. Baum has supplied quite detailed proofs in the beginning to help students approaching this type of axiomatic mathematics for the first time. Similarly, in the first part of the book problems are elementary, but they become progressively more difficult toward the end of the book. References have been supplied to suggest further reading to the interested student.
This second English edition of a very popular two-volume work presents a thorough first course in analysis, leading from real numbers to such advanced topics as differential forms on manifolds; asymptotic methods; Fourier, Laplace, and Legendre transforms; elliptic functions; and distributions. Especially notable in this course are the clearly expressed orientation toward the natural sciences and the informal exploration of the essence and the roots of the basic concepts and theorems of calculus. Clarity of exposition is matched by a wealth of instructive exercises, problems, and fresh applications to areas seldom touched on in textbooks on real analysis. The main difference between the second and

first English editions is the addition of a series of appendices to each volume. There are six of them in the first volume and five in the second. The subjects of these appendices are diverse. They are meant to be useful to both students (in mathematics and physics) and teachers, who may be motivated by different goals. Some of the appendices are surveys, both prospective and retrospective. The final survey establishes important conceptual connections between analysis and other parts of mathematics. The first volume constitutes a complete course in one-variable calculus along with the multivariable differential calculus elucidated in an up-to-date, clear manner, with a pleasant geometric and natural sciences flavor.

This softcover edition of a very popular two-volume work presents a thorough first course in analysis, leading from real numbers to such advanced topics as differential forms on manifolds, asymptotic methods, Fourier, Laplace, and Legendre transforms, elliptic functions and distributions. Especially notable in this course is the clearly expressed orientation toward the natural sciences and its informal exploration of the essence and the roots of the basic concepts and theorems of calculus. Clarity of exposition is matched by a wealth of instructive exercises, problems and fresh applications to areas seldom touched on in real analysis books. The first volume constitutes a complete course on one-variable calculus along with the multivariable differential calculus elucidated in an up-to-day, clear manner, with a pleasant geometric flavor.

The text begins with a review of group actions and Sylow theory. It includes semidirect products, the Schur-Zassenhaus theorem, the theory of commutators, coprime actions on groups, transfer theory, Frobenius groups, primitive and multiply transitive permutation groups, the simplicity of the PSL groups, the generalized Fitting subgroup and also Thompson's J-subgroup and his normal p-complement theorem. Topics that seldom (or never) appear in books are also covered. These include subnormality theory, a group-theoretic proof of Burnside's theorem about groups with order divisible by just two primes, the Wielandt automorphism tower theorem, Yoshida's transfer theorem, the ``principal ideal theorem'' of transfer theory and many smaller results that are not very well known. Proofs often contain original ideas, and they are given in complete detail. In many cases they are simpler than can be found elsewhere. The book is largely based on the author's lectures, and consequently, the style is friendly and somewhat informal. Finally, the book includes a large collection of problems at disparate levels of difficulty. These should enable students to practice group theory and not just read about it. Martin Isaacs is professor of mathematics at the University of Wisconsin, Madison. Over the years, he has received many teaching awards and is well known for his inspiring teaching and lecturing. He received the University of Wisconsin Distinguished Teaching Award in 1985, the Benjamin Smith Reynolds Teaching Award in 1989, and the Wisconsin Section MAA Teaching Award in 1993, to name only a few. He was also honored by being the selected MAA Polya Lecturer in 2003-2005.