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Elements of Real Analysis

M. A. Al-Gwaiz and S. A. Elsanousi

Chapman & Hall/CRC
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Mathematics

Focusing on one of the main pillars of mathematics, **Elements of Real Analysis** provides a comprehensive introduction to analysis on the real line. The book prepares you for conducting analysis in higher dimensions and more abstract spaces by building up the analytical skills and structures needed for handling the basic notions of limits and continuity in a simple concrete setting.

Largely self-contained, the book begins with the fundamental axioms of the real number system and gradually develops the core of real analysis. The first few chapters present the essentials needed for analysis, including the concepts of sets, relations, and functions. The following chapters cover the theory of calculus on the real line, addressing theorems like mean value, inverse function, Taylor's, and Weierstrass approximation. The final chapters focus on the more advanced theory of Lebesgue measure and integration.

Requiring only basic knowledge of elementary calculus, this book presents the necessary material for students and professionals in various mathematics-related fields, such as engineering, statistics, and computer science, to explore real analysis.

Features

- Presents a foundation in real analysis, starting with the basics and gently progressing to more complex topics
- Covers the real number system, sequences, and infinite series
- Explores functions, limits, continuity, differentiability, and integration, including Riemann integrals
- Includes sequences and series of functions and their modes of convergence, naturally building on the properties of numerical sequences and series
- Provides an introduction to advanced probability and stochastic theory by including two chapters on Lebesgue measure and integration

M.A. Al-Gwaiz and **S.A. Elsanousi** are mathematics professors at King Saud University, Riyadh, Saudi Arabia.

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6000 Broken Sound Parkway, NW
Suite 300, Boca Raton, FL 33487
270 Madison Avenue
New York, NY 10016
2 Park Square, Milton Park
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M.A. Al-Gwaiz

Sturm-Liouville Theory and its Applications

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The treatment relies heavily on the convergence properties of sequences and series of numbers as well as functions, and assumes a solid background in advanced calculus and an acquaintance with ordinary differential equations and linear algebra. Familiarity with the relevant theorems of real analysis, such as the Ascoli-Arzelà theorem, is also useful for following the proofs.

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about the author . . .

M. A. AL-GWAIZ is an Associate Professor of Mathematics at King Saud University, Riyadh, Saudi Arabia. He is the author of a textbook on complex analysis and of a number of papers which reflect his research interests in boundary value problems for partial differential equations, differential geometry, and mathematical physics. Dr. Al-Gwaiz is a member of the American Mathematical Society and the National Society for Mathematics (Saudi Arabia). He received the M.S. degree (1967) in mathematics from the Courant Institute of Mathematical Sciences, New York University, and the Ph.D. degree (1972) in mathematics from the University of Wisconsin – Madison.

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