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Soggetti	Mathematics Mathematical analysis Sequences (Mathematics) Differential equations Measure theory Functions of real variables Càlcul Anàlisi matemàtica Successions (Matemàtica) Analysis Sequences, Series, Summability Differential Equations Measure and Integration Real Functions Llibres electrònics
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Nota di contenuto	Preface -- 1. Logic and Sets -- 2. Integers -- 3. Construction of the Real Numbers -- 4. The Real Numbers -- 5. Real Sequences -- 6. Some Applications of Real Sequences -- 7. Real Series -- 8. Additional Topics in Real Series -- 9. Functions and Limits -- 10. Continuity -- 11. Function Sequences and Series -- 12. Power Series -- 13. Differentiation -- 14. Some Applications of Differentiation -- 15. Riemann and Darboux Integration -- 16. The Fundamental Theorem of Calculus -- 17. Taylor and MacLaurin Series -- 18. Introduction to

Measure Theory -- 19. Lebesgue Integration -- 20. Double Integrals -- Solutions to the Exercises -- Bibliography -- Index.

Sommario/riassunto

This book provides an introduction to real analysis, a fundamental topic that is an essential requirement in the study of mathematics. It deals with the concepts of infinity and limits, which are the cornerstones in the development of calculus. Beginning with some basic proof techniques and the notions of sets and functions, the book rigorously constructs the real numbers and their related structures from the natural numbers. During this construction, the readers will encounter the notions of infinity, limits, real sequences, and real series. These concepts are then formalised and focused on as stand-alone objects. Finally, they are expanded to limits, sequences, and series of more general objects such as real-valued functions. Once the fundamental tools of the trade have been established, the readers are led into the classical study of calculus (continuity, differentiation, and Riemann integration) from first principles. The book concludes with an introduction to the study of measures and how one can construct the Lebesgue integral as an extension of the Riemann integral. This textbook is aimed at undergraduate students in mathematics. As its title suggests, it covers a large amount of material, which can be taught in around three semesters. Many remarks and examples help to motivate and provide intuition for the abstract theoretical concepts discussed. In addition, more than 600 exercises are included in the book, some of which will lead the readers to more advanced topics and could be suitable for independent study projects. Since the book is fully self-contained, it is also ideal for self-study.