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Real analysis. A comprehensive course in analysis, part 1.

Providence, RI: American Mathematical Society (AMS) (ISBN 978-1-4704-1099-5/hbk). xx, 789 p. (2015).

The volume under review presents a clear, thorough treatment of the theorems and concepts of real analysis. The author is concerned with the fundamentals and touchstone results of the real analysis in full rigor, but in a style that requires little prior familiarity with proofs or mathematical language. The book develops those concepts and tools in real analysis that are vital to every mathematician, whether pure or applied, aspiring or established. These works present a comprehensive treatment with a global view of the subject, emphasizing the connections between real analysis and other branches of mathematics. From a first point of view, the volume presents the infinitesimal calculus of the twentieth century with the ultimate integral calculus (measure theory) and the ultimate differential calculus (distribution theory). From another point of view, it shows the triumph of abstract spaces such as topological spaces, Banach and Hilbert spaces, measure spaces, Riesz spaces, Polish spaces, locally convex spaces, Fréchet spaces, Schwartz space, and Lebesgue L^p-spaces. The text includes many elegant proofs and an excellent choice of topics, including the Fourier series and transform, dual spaces, the Baire category, fixed point theorems, probability ideas, and Hausdorff dimension. The book includes plenty of relevant applications, for instance the constructions of nowhere differentiable functions, Brownian motion, space-filling curves, solutions of the moment problem, Haar measure, and equilibrium measures in potential theory. Numerous examples and exercises are integrated into the main text as well as the end of each chapter to reinforce the methodology. With clear proofs, detailed examples, and numerous exercises, this book gives a thorough treatment of the subject. It provides a logical development of material that will prepare readers for more advanced analysis-based studies. This volume prepares the reader for further exploration of measure theory, functional analysis, harmonic analysis, and beyond. The clarity and breadth of *Real analysis. A comprehensive course in analysis, part 1* make this volume a welcome addition to the personal library of every mathematician.

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