



A Guide to Advanced Real Analysis (Dolciani Mathematical Expositions, Vol. 37)

By *Gerald B. Folland*

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This book is an outline of the core material in the standard graduate-level real analysis course. It is intended as a resource for students in such a course as well as others who wish to learn or review the subject. On the abstract level, it covers the theory of measure and integration and the basics of point set topology, functional analysis, and the most important types of function spaces. On the more concrete level, it also deals with the applications of these general theories to analysis on Euclidean space: the Lebesgue integral, Hausdorff measure, convolutions, Fourier series and transforms, and distributions. The relevant definitions and major theorems are stated in detail. Proofs, however, are generally presented only as sketches, in such a way that the key ideas are explained but the technical details are omitted. In this way a large amount of material is presented in a concise and readable form.

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Editorial Review

Review

This work serves as a Baedeker to the more accessible parts of the terrain of advanced real analysis, providing an overview for those less familiar, a refresher for those more so, and a key to the features of that terrain, including what high points and cultural monuments to visit if planning to explore the subject more seriously. Intended as a guide for graduate students preparing for qualifying exams. --F. E. J. Linton, Choice

The book covers material that is standardly taught at universities in graduate courses of real analysis and measure theory, plus some extra material from point-set topology and functional analysis, including some basic facts from the theory of function spaces. On the one hand it is written in a very skillful manner in a brief and concise reader-friendly way, but, on the other hand, the text is surprisingly comprehensive. The main point is that all the major theorems and definitions are given in great detail. The scope of the text is quite deep and broad at the same time. To give just one instance, it goes as far as the theorems of Arzela-Ascoli and Stone-Weierstrass. Technical parts of proofs that a gifted student can do by himself or herself are often omitted, but all the key ingredients are carefully filled in. The book has a very helpful prologue dealing with the basics of set theory. The first five chapters cover topology, measure and integration, the rudiments of functional analysis, and some important facts about basic function spaces. The last chapter contains applications of the material from the preceding ones to analysis on Euclidean space, more precisely convolutions, Fourier series, and even distributions. The book is a wonderful example of how much can be achieved in a relatively small space. --Lubos Pick, Mathematical Reviews

About the Author

Gerald B. Folland received his bachelor s degree from Harvard University in 1968 and his doctorate from Princeton University in 1971. After two years at the Courant Institute, he moved to the University of Washington, where he is now professor of mathematics. He is the author of ten textbooks and research monographs in the areas of real analysis, harmonic analysis, partial differential equations, and mathematical physics.

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