

ZMATH 2014a.00725

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Measure, integral, derivative. A course on Lebesgue's theory.

Universitext. New York, NY: Springer (ISBN 978-1-4614-7195-0/pbk; 978-1-4614-7196-7/ebook). x, 146 p. (2013).

The monograph is intended for a one semester course on Lebesgue's theory and deals with measure, integration and differentiation. It is accessible to upper-undergraduate and lower graduate level students, and the only prerequisite is a course in elementary real analysis. The book contains four chapters and an appendix, the first chapter being devoted to some preliminaries that intend to fill the gap between what the student may have learned before and what is required to understand this text; and the appendix being devoted to remedy a limitation of the book that, in the second and third chapters, restricts attention to bounded sets of the real line. The Lebesgue measure of a bounded set and measurable functions are studied in Chapter 2 which finds its highest point in the theorem of Egorov, of importance in establishing convergence properties of integrals. The main elements of the theory of Lebesgue integral are presented in Chapter 3, only for functions over bounded sets, although the convergence theorems are proved establishing the passage to the limit under the integral sign. Chapter 4 presents the Lebesgue's theorem about differentiability of monotone functions and his versions of the fundamental theorems of calculus. The book proposes 187 exercises where almost always the reader is proposed to prove a statement. This reviewer thinks that this book is a very helpful tool to get into Lebesgue's theory in an easy manner.

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Classification: I55

Keywords: Lebesgue measure; Lebesgue integral; differentiation

doi:10.1007/978-1-4614-7196-7