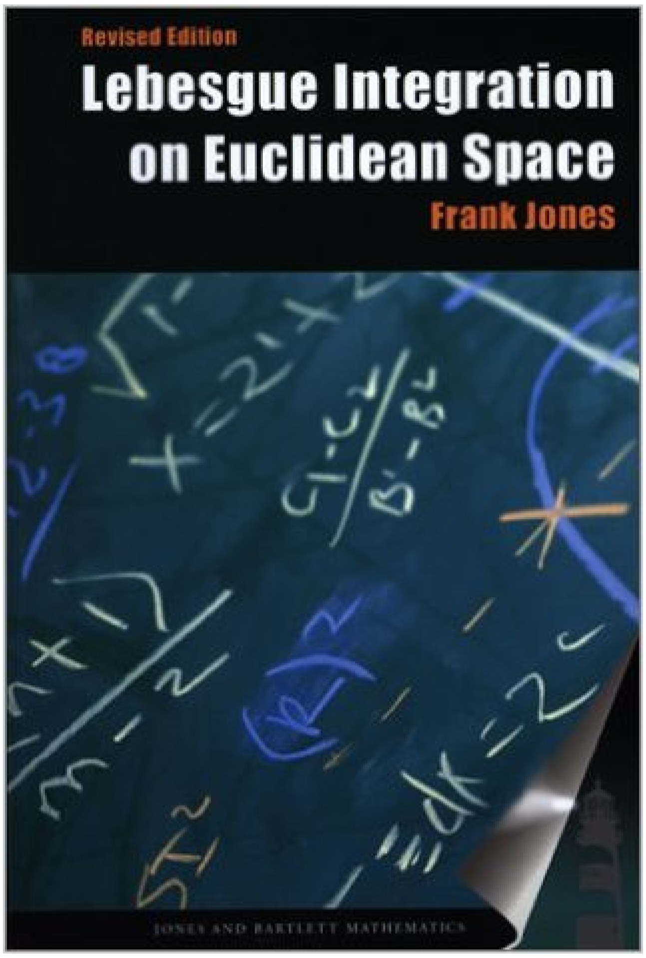
Lebesgue Integration On Euclidean Space, Revised Edition (Jones And Bartlett Books In Mathematics)



Synopsis

Lebesgue Integration on Euclidean Space contains a concrete, intuitive, and patient derivation of Lebesgue measure and integration on Rn. Throughout the text, many exercises are incorporated, enabling students to apply new ideas immediately. Jones strives to present a slow introduction to Lebesgue integration by dealing with n-dimensional spaces from the outset. In addition, the text provides students a thorough treatment of Fourier analysis, while holistically preparing students to become workers in real analysis.

Book Information

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Customer Reviews

One of the problems with modern mathematics is its obsession with rigor which has been attended, over the last few decades, by a mushrooming of symbols and jargon. Much of it is not clearly related to the ideas they serve to label, as evidenced by such terms as the topological use of "filter" whose etymology is obscure (ascribed by some to H. Cartan). Moreover, the particular subject of Lebesgue integration and its generalizations is made even more confusing by a wide variety of approaches depending on an author's penchants--many of whom are enamored with a purely axiomatic approach and who make little or no appeal to intuition or--God forbid!--pictures. The author of the present work is obviously someone who has actually taught mathematics and taught it lovingly. This book is an excellent read with lots of interesting topics well explained from a student's point of view. There seems to be a nice ramping from the truly elementary to the sophisticated, which means the book will interest experienced mathematicians, scientists and engineers. There are lots of "doable" problems that the reader can solve along the way. For the experienced mathematician these little problems help alot as a refresher (Oh!, now I remember, that's how you do it.). I like the emphasis on Euclidean space. Somehow, I always feel more comfortable there! It gives me things I can actually construct and doodle on paper. And, it allows the author to use a few figures in a meaningful way. Which is another of the book's strong points and if I could recommend a future improvement, it would be to bring on more of those pictures! Tristram Needham has done a nice job along these lines with his book "Visual Complex Analysis." (I ordered several copies as Christmas gifts--just kidding!).

If you want to see measure theory and Lebesgue integration developed in their original real analysis framework look no further. I admit he uses the artifice of special rectangles at first but he generalizes these to the familiar intervals (even uses rotation matrices) and in the end you get the Lebesgue theory from piecewise comprehensible components. The first chapter is a review of the needed real analysis concepts and theorems. There's a heavy use of set theory and sequences in this chapter. No surprise as set theory and orderings are key to the development. In the proof of the Heine-Borel Theorem he makes use of what he calls the completeness of the real number field as exemplified in the fact (theorem) that a bounded increasing real sequence converges to a limit. Completeness is generally the least upper bound property which is key to proving this sequence theorem (found in chapter 3 of Rudin's Principles). Within the first few pages he gave an exercise on the lim sup and lim inf of a sequence of sets and this actually involves an ordering by inclusion (a set is viewed as the greater if it contains the other). For example if you take the intersection of a few arbitrary sets and compare it to the intersection with one of those sets left out, this second intersection is the greater. You'll use these ideas in the exercise along with notions of union and complement. Don't fret if you can't do all the exercises-only a few are used in the text development and if necessary can be found online. There was an exercise on lim sup of a real sequence which I had to look up because I learned this was the supremum of its subsequential limits and had never known of an actual construction. This is on p. 60 of chapter 2.

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