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Integral, Measure, and Ordering

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xiii + 378 pages.
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The referred book offers a consistent view on the recent state of the art in measure and integration theory. It deals the topics with respect to three main points of view. The first one regards some relations of the concept of ordering structures to measure and integration theory. The second point of view brings the idea of fuzzy set to the measure theory and focuses their mutual co-existence. The third one brings formal theoretical apparatus of quantum mechanical systems.

Some parts of the book were already published in 1992 as a special volume entitled *Measure Theory* by Publishing House of the Slovak Academy of Sciences but most of its chapters are completely new.

The content of the referred book is divided in 11 chapters and completed by two appendices (on D-posets by F. Chovanec and K. Kôpka, and on order convergence and order topology by H. Kirchheimová and Z. Riečanová), by very rich list of *References* (more than 990 items) and *Index*.

After the introductory first chapter the original approach to the convergence of sequences of measurable functions is studied in Chapter 1. It uses the concept of set of small measure which connects the presented theory with fuzzy set theoretical concepts. Extension theory for functions defined on sublattices and its modifications are dealt in the next two chapters. Chapter 5 is devoted to Henstock–Kurzweil integral. The quantum logic theory is presented in Chapter 6 and its alternatives are developed in Chapters 7 and 8. A generalization of the obtained results to algebraic systems (MV-algebras, D-posets) is suggested in the following Chapter 9. Chapter 10 presents a review of special theory of entropy of dynamic systems with fuzzy partitions being considered instead of the set ones. Finally, Chapter 11 is devoted to the multifunctions and their measurability and integrability.

The book approaches the classical topics in a distinctly modern way using concepts and results of relatively new branches of mathematics. Even if the presentation of the results is based on recent and abstract apparatus, the final text is well readable, logically consistent and structured in a lucid way.

Integral, measure and ordering concepts belong to the fundaments of mathematical thinking and the referred book can be recommended to everyone who wants to learn it on a modern level or to find a new view on the concepts he knows from his previous study.

Milan Mareš