"Application of the Theory of Integration to Limit Processes" is the title of Chapter seven. In this chapter the reader will find the analogues of Egeroff's theorem, mean convergence, and Birkhoff's ergodic theorem. The latter subject should be of particular interest to the reader.

Chapters eight, nine and ten, entitled "The Computation of Measure Functions", "Regular Measure Functions" and "Isotypic Regular Measure Functions" respectively, deal with the study of measure functions (exterior measures) generated by weight functions. Measure functions generated by countably-additive and non-negative weight functions are called regular and are studied in detail. Inner measures are introduced and an interesting result concerning the arithmetic mean of a regular measure function and its corresponding inner measure is given.

The Jordan decomposition theorem and the Radon-Nikodym theorem are treated in Chapter ten entitled "Isotypic Regular Measure Functions".

Chapter eleven, entitled "Content Functions", deals with the theory of integration in finite-dimensional Euclidean spaces. Among other things the reader will find in this chapter a treatment of the Vitali covering theorem, the Lebesgue integral and an introduction to the theory of linear measures. Linear measures are determined by those measure functions which are generated by the diameter set function.

The book concludes with an appendix on the theory of partially ordered sets.

A list of symbols and an extensive index are included.

The translation is excellent and we may be thankful to the translator and the publisher for their effort to make this important book available in English.

W. A. J. Luxemburg, California Institute of Technology

<u>Algorithmes et Machines à Calculer</u>, by B. A. Trahtenbrot. Translated from the second Russian edition (1960) by A. Chauvin. Dunod, Paris, 1963. xii + 149 pages.

This book is a pleasant popular account of the basic concepts and results of the modern theory of computability. The reader is introduced to the theory by considering successively: algorithms from number theory; winning strategies in two-person games of skill; labyrinth problems; and special cases of the word problem. An interesting feature is a proof that in games such as chess at least one of the

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players has a non-losing strategy. This leads to a general notion of an algorithm or computation procedure, developed first with reference to a standard Soviet machine language, and then to the language of Turing machines as an idealization. The "fundamental hypothesis" is then stated that any procedure which one would intuitively call an algorithm can be carried out on a Turing machine. The following chapter points out that in a suitable sense all such procedures can be carried out on a single "universal" Turing machine. From this, the "basic undecidability result", it follows that there is no complete algorithm for deciding whether a given Turing machine with a given initial configuration will halt. The result of Novikov that the word problem for groups is unsolvable is mentioned, and the proof of the unsolvability of the word problem for semi-groups is outlined. A few final remarks are added concerning the mathematical significance of undecidability results.

The translation seems to be fairly clear. The reviewer would suggest, however, that names of Russian journals and books should not be translated, as has been done in this translation, but rather transliterated. For example, the reader must discover for himself that the references given to "Mathematiques à l' école" actually refer to the well-known Soviet pedagogical journal Mathematika v Škole.

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Diophantine Approximations, by Ivan Niven. Interscience Tracts in Pure and Applied Mathematics, No. 14. Wiley, New York - London, 1963. viii + 68 pages. $5.00.

This book comprises the ninth annual series of Earle Raymond Hedrick Lectures of the Mathematical Association of America. The material is a review of the problem of approximating irrationals by rationals in both K(1) and K(i). The two first chapters of five are concerned with the approximation of irrationals by rationals and the product of linear forms in K(1). The last two chapters develop the same topics for K(i) and the third chapter is on the multiples of an irrational number. Many of the proofs are either new or refurbished and the text presents a neat exposition of the subject. At the end of each chapter is a brief review of related material and the sources of the text together with some conjectures and other background material.

The proofs avoid the use of continued fractions so that the treatment is both brief and self-contained. For my own part, I would like a longer text incorporating some of the material only touched on in the last section of each chapter. The material that is in the text, however, is both valuable and well presented.

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