stable mechanisms, especially in Chapter VI. Chapters VII–XII refer to generalizations of the above theory to cases concerning the stability of a moving equilibrium or cases where more complicated feedback processes are permitted.

The style of this book is in the spirit of the engineering sciences rather than mathematics. For example the main problem of determining the set $B(\rho)$ is only mentioned casually and the general properties of $B(\rho)$ are never considered (is $B(\rho)$ open, connected, convex, bounded; and how does $B(\rho)$ vary with ρ?). Instead the text begins (on the second page of Chapter I) with the analysis of examples of electromechanical actuators (although only the mathematical and not the engineering description of the mechanism is used). From an elaboration of examples and particular cases the author proceeds to a great number of calculations and formulas which apply in various special circumstances. For instance, in Chapter II there are 193 numbered formulas.

This wealth of special cases makes the text difficult for mathematicians but valuable for theoretical engineers. At every stage the author tests his latest formula against certain standard control problems of Bulgakov and this serves to compare the power of the various methods developed. In summary, this is a valuable text for engineering stability analysis and also a book which contains many ideas that should interest mathematicians.

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The theory of Lebesgue measure and integration. By S. Hartman, and J. Mikusiński. Translated from Polish by Leo F. Boron. Pergamon, New York, 1961. 176 pp. $5.00.

This brief text offers an introduction to that part of the theory of real functions which is concerned with measure and integration. Only linear Lebesgue measure is considered, except in the last chapters, which deal with plane measure. Because of this limitation it is possible to develop the theory by elementary techniques, with only a few set-theoretical preliminaries. Essentially nothing is presupposed beyond a good knowledge of the ϵ, δ fundamentals of calculus.

Following a line of development suggested by M. Riesz, the measure of an open set is defined as the sum of the lengths of its components; a set E is measurable if for every positive ϵ it can be represented in the form $O-A$, where O is open and A is a subset of an open set of measure less than ϵ; the measure of E is the lower bound of the measures of its open supersets. On this basis the properties of Lebesgue measure are obtained rather easily. The integral is defined for bounded measurable functions on bounded measurable sets in the usual way, using Lebesgue sums. It is then extended to unbounded functions and to infinite intervals, and compared with the Riemann integral. This development occupies about 70 pages. Approximately equal space is devoted to establishing the principal properties of this integral: convergence theorems, Vitali's theorem, differentiation of functions of bounded variation, absolute continuity, the completeness of both real and complex L^p spaces, Lusin's theorem, orthogonal expansions and the Riesz-Fischer theorem. The last 34 pages deal with plane measure, multiple integration, and the Riemann-Stieltjes integral.

All the material is standard and classical; the aim is to include "those portions of the theory which find immediate application in other fields, e.g. in probability theory or theoretical physics." The exposition is mostly self-sufficient, though the critical reader will occasionally find it necessary to expand a proof or justify a tacit assumption. For some reason the authors omit a proof that the positive and negative variations of a continuous function of bounded variation are continuous, although this fact is mentioned and later used. With greater justification, Féjèr's theorem is explicitly assumed without proof. No problems or exercises are included.

This book may be recommended, especially as preliminary or collateral reading in connection with a more intensive and sophisticated course in measure theory or real functions. The current fashion is to present measure and integration theory in a more general and postulational form. This is as it should be, but thereby important classical theorems are sometimes neglected. This book may help to fill the gap. It may also prove useful to an applied mathematician who wishes to learn quickly the essentials of Lebesgue theory, although it may be questioned whether a knowledge of only the ordinary Lebesgue integral is adequate nowadays for either probability theory or physics. According to the preface, "This book contains material which constitutes a good introduction to the theory of real functions. The subject matter comprises concepts and theorems . . . which every young mathematician ought to know." These claims are certainly justified, and since there are now so many things that a young mathematician needs to know it is useful to have available this brief exposition of the classical theories presented here.

J. C. OXTOBY

Mathematical theory of compressible fluid flow. By Richard von Mises. Completed by Hilda Geiringer and G. S. S. Ludford. Applied Mathematics and Mechanics, vol. 3. Academic Press, New York, 1958. 13+514 pp. $15.00.

It is pointed out in the preface to this book that only the first three