compresses the material on bars, membranes, and plates, more than doubles the space devoted to radiation and scattering, and adds a number of new topics. The space devoted to the different topics is in line with their significance in modern acoustics. Thus the chapters on sound in ducts and rooms and on the coupling of acoustical systems reflect the importance of these problems in architectural acoustics and noise control; the chapters on the acoustics of moving media and on nonlinear acoustics treat problems of importance in modern fluid dynamics.

The text is strongly mathematical and should appeal to those who have found the earlier editions useful. The chapters on plasma acoustics and Brillouin scattering treat topics of importance in physical acoustics, but the analysis here too is from the formal mathematical viewpoint, rather than from basic physical considerations.

The book contains a considerable number of relevant problems to be worked by the reader. It is to be regretted that it does not also possess references to recent journal literature in this field.

Shock and Vibration

Vibration and Shock in Damped Mechanical Systems. By J. C. Snowdon. *John Wiley & Sons, Inc., New York, N. Y., 1968.* xiv and 486 pages. $18.95.

REVIEWED BY D. I. G. JONES[5]

Few recent books have been devoted exclusively to consideration of the response of damped structures to shock and vibration. Professor Snowdon's book not only contains a wealth of detailed information concerning the damping properties of rubberlike materials and vibration isolation, mechanical impedance, and wave propagation in damped beams and rods, but it also serves as a valuable introductory text for those concerned with analysis of the effect of damping on the response of more complex structures. The book is very well written and illustrated.

Viscoelasticity

Viscoelasticity. By Wilhelm Flügge. Blaisdell Publishing Company, Waltham, Mass., Toronto, London, 1967. viii and 127 pages.

REVIEWED BY J. BESSELING[6]

The author has presented us with an admirably concise and consistent introductory text on linear viscoelasticity. It is aimed at a reader who is familiar with the basic concepts of mechanics, including stress and strain in two dimensions, and the technique of deriving differential equations from the consideration of the mechanics of an infinitesimal element. On the mathematical side, the prerequisite is calculus and a brief exposure to complex numbers and to linear differential equations. Laplace transformation, integral equations, partial differential equations, and complex contour integration are explained as far as needed.

The various chapters of the book contain an exceptionally clear exposition on viscoelastic models, hereditary integrals, viscoelastic beams, vibrations, axial impact, buckling of columns, and viscoelasticity in three dimensions. For illustrative examples results are derived which are of interest for engineering tasks, but the author has omitted purposely reference to specific applications, which, in the author's words, are here today and gone tomorrow, to make room for others. Thereby the whole space of this little book could be devoted to a discussion of the basic viscoelastic phenomena and of the various tools of mathematical analysis. The author succeeds in combining generality with utmost simplicity, for instance, in introducing the concept of complex compilance and in discussing the correspondence principle.

The book can be strongly recommended to teachers of a course on this special subject of viscoelasticity, but it will be found particularly useful by those who want to widen their field of knowledge in mechanics, but who so often are being discouraged by unbalanced or learned treatises on the subject. For self-study, the exercises at the end of each chapter are well chosen.

Optimization

Optimization in Control Theory and Practice. By I. Gumowski and C. Mira. Cambridge University Press, 1968. viii and 242 pages. $10.50.

REVIEWED BY A. E. PEARSON[7]

This book is a useful addition to the growing library of books on optimization. Particular emphasis is given to the treatment of extremal problems by the calculus of variations, although one chapter is devoted to the relationships between the calculus of variations and the techniques of dynamic programming and the maximum principle. Chapter 1, which is entitled "The Gap Between Control Theory and Practice," provides an interesting discussion on the problem of modeling a dynamical system and its importance in formulating extremal problems. Chapters 2 and 3 contain a résumé of the known results of the calculus of variations with special reference to the work of Carathéodory.

A noteworthy feature of this presentation is the generous display of examples which the authors use to emphasize the importance of the property of semicontinuity of functional to be minimized, the effect of the domain of definition of a functional on the existence of solutions, and a number of topics relating to the existance and uniqueness of solutions to extremal problems. Unfortunately, there is little attempt to reconcile the gap between theory and practice as it was rather systematically discussed in the first chapter. In addition, the formulation of extremal problems is carried out in the context of the classical calculus of variations rather than in the context of optimal control theory, and none of the examples in the book are drawn from the field of control systems. Therefore, the book will be mainly of interest to the research engineer and applied mathematician seeking an appendage of results in the classical calculus of variations.

Structures

Theory of Inelastic Structures. By T. H. Lin. John Wiley & Sons, Inc., New York, N. Y., 1968. xiv and 454 pages. $19.95.

REVIEWED BY T. H. H. PIAN[8]

The present book is dealing with the analysis of structures with inelastic strains which, according to the author's definition, includes all non-Hookian strains such as thermal, time-independent plastic and time-dependent creep strains. The methods developed in this book are based on an extended Duhamel's analogy by treating a structure involving thermal strain and/or other inelastic strains as an identical elastic structure with an additional set of equivalent body forces.

The book consists of 12 chapters. Chapter 1 presents a review of stress and strain and governing equations for an elastic solid and Chapter 2 introduces the analogy between inelastic strains,

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