Journal of APPLIED MECHANICS

Book Reviews

Photomechanics

Introduction to Photomechanics. By A. J. Durelli and W. F. Riley. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1965. Bound, xiii and 402 pp. $11.65.

REVIEWED BY R. GUERNSEY[1]

ALTHOUGH the name suggests something broader, this is predominantly a book on photoelasticity, intended to serve as a teaching text for students and a reference for practicing engineers. The instructional material is contained in the first eight chapters which systematically present the basic theory of photoelasticity and discuss the needed equipment from a practical point of view. Outstanding in this section is the chapter on photoelastic materials. Here the mechanical and optical properties of four typical materials used by the authors are discussed in great detail with emphasis on their viscoelastic behavior. However, there is perhaps too much detail for the beginner. By comparison, the chapter on data interpretation is extremely brief and would need to be supplemented in the classroom.

The last four chapters present a series of applications to two and three-dimensional static, dynamic, and thermal problems drawn from the authors' extensive experience. Nothing really new is added here since all of this material has appeared previously in the technical literature. However, it makes a handy reference section for the types of applications presented.

The book is eminently readable and profusely illustrated. Certainly all photoelasticians will find it interesting and worth possessing. This reviewer felt that a bit more space might have been devoted to other optical methods, such as moiré, to justify the all-inclusive title.

[1] TRW Systems, Inc., Redondo Beach, Calif.

Vibration

Dynamics of Vibrations. By E. Volterra and E. C. Zachmanoglou. Charles E. Merrill Books, Inc., Columbus, Ohio, 1965. Bound, xvi and 622 pp. $17.50.

REVIEWED BY H. KOLSKY[2]

A WIDE variety of topics in the theory of vibrations is covered in this book. After an introductory chapter which discusses fundamental definitions and Fourier series, there follows a chapter on the simple harmonic oscillator and on one-degree-of-freedom systems with and without damping. The section on damping is much more thorough and realistic than is to be found in most books and includes some discussion of Coulomb friction and viscoelastic effects as well as of the more usual viscous damping. This second chapter also includes a discussion on vibration isolation and on vibration measuring constants. The next three chapters discuss systems with several degrees of freedom, continuum systems (strings, membranes, bars, and plates) and nonlinear oscillations. The final chapter deals with wave propagation in elastic solids and the book ends with an account of dynamic stress-strain measurements.

The book maintains a simple approach throughout and contains a wide variety of illustrative problems at the end of each chapter. Several of the chapters reflect the research interests of the authors and help to give the book an individual flavor often absent in elementary treatises. The bibliography is extensive and short biographical notes on some workers in the field are included. The book should be of value both to graduate students and as an introduction to the whole subject of vibrations.

[2] Professor, Department of Applied Mathematics, Brown University, Providence, R. I.