sional, singular integral equations, which, however, can be regularized. The regularization problem is solved by a combination of the methods given by Giraud (Ann. Ec. Norm. (3), II, Fasc, 3, 1934, and 4, 1936) and Mikhlin (Vestnik of Leningrad Univ., no. 1, 1956).

The work done by the author is a continuation of the works by Fredholm, Lauricella, Weyl, and Lichtenstein. In these early works only the first fundamental boundary-value problem is exhaustively studied. Theorems of existence and uniqueness for the three boundary-value problems of elastostatics have been given by Fichera (Ann. St. Norm. Sup. Pisa, Ser. III, vol. IV, pp. 1-46, 1950), who uses a method based on a functional interpretation of Beppo’s reciprocity theorem.

In the closing chapter, approximate solutions are discussed. These solutions are based on the approximate representation of integral equations by sets of linear algebraic equations.

The reviewer believes that this comprehensive and important contribution to the literature of the theory of the boundary-value problems in elasticity should have been easier to read if the advantages of tensor notations had been considered.

Nonlinear Mathematics


REVIEWED BY I. FLÜGGE-LOTZ*

There is no doubt that many engineers who are still in their very active years were trained in a period in which linear mathematics was the essential tool for treating technical problems. Times have changed; many new problems lead engineers into fields with nonlinearities. Therefore, there is an urgent need for good books which will guide them on their new way.

The present book, I think, is a great help in showing what has changed in mathematical thinking and expressions since about 1955. One can argue about the year. It depends on the age of the writer and of the reader of this article. The content of the book is described by the titles of its sections: 1—Linear and Nonlinear Transformations, 52 pages; 2—Nonlinear Algebraic and Transcendental Equations, 39 pages; 3—Nonlinear Optimization, Nonlinear Programming and Systems of Inequalities, 51 pages; 4—Nonlinear Ordinary Differential Equations, 78 pages; 5—Introduction to Automatic Control and the Pontryagin Principle, 40 pages; 6—Linear and Nonlinear Prediction Theory, 47 pages.

The reviewer wonders whether most readers will really work through the entire first chapter before they look at that chapter which attracts them most because they need its material. It is a very difficult question, how and where to store in a book all those details which one needs in some chapter and which one would not like to place there and interrupt the main line of thought. The reader will benefit from whatever chapter he reads; the fine reference list at the end of each chapter will be particularly appreciated.

The newness of the material and quality of the chapters vary; this is understandable due to the wide scope of the book. Some chapters, e.g., nonlinear ordinary differential equations, contain material known to many and easily accessible to others.

In conclusion, the book will find its place on the shelves of many engineers who have to deal with a new problem and need to see what tools are available.

Vibration


REVIEWED BY JULIUS MIKLÓWITZ*

This book is basically concerned with structural vibration problems of interest in civil engineering, and their solutions. Two introductory chapters present the governing equations for treating dynamic problems in linear elasticity, viscoelasticity, and thermoelasticity. The body of the text begins with treatments of the vibration of strings and rods (i.e., the simple structures) and subsequently treats the more complicated cases: continuous beams, frame structures, plates, and shells. Elementary theories are used throughout; e.g., Euler-Bernoulli for flexural vibrations of rods. The later chapters are devoted to discussions of elastic wave propagation, approximate methods in vibrations of structures (finite differences, Galerkin method, etc.), and an introduction to operational mathematics (and related tables) because of its uniform use throughout the book.

The author has accomplished his task well. In addition to the many solutions and related discussions his book contains, it should also give the reader a degree of insight into the means for handling other related problems that might arise. Of particular interest is the material on dynamic buckling of plates, on vibrations of rectangular plates having discontinuous boundary conditions (e.g., an edge partly clamped and partly simply supported), and on dynamic thermoelasticity. The book could serve as a broad reference for a first-year graduate course on vibrations of structures.

The author can be criticized for not supplementing his references with a few more modern ones, important to the present and future of his subject. This is particularly true in the case of rods and plates in the discussions on higher-order effects in approximate theories, and exact theory frequency spectra and wave propagation. The book was translated from the Polish by Henryk Zorski.

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