Volterra integral equations, and singular integral equations. While detailed derivations and proofs are omitted, the pertinent theories are set forth with great clarity. A distinctive feature of the work are the numerous examples inserted throughout the text, drawing from a variety of topics in mathematical physics and engineering, and richly illustrating the theoretical results presented. There are also frequent references to the original literature.

The considerable scope of the work can best be seen from the following table of contents.



The translation by Scripta Technica, Inc., under the editorial supervision of Robert E. Kalaba, is carried out with competence. The editor is to be commended for making this important work accessible to the English-speaking mathematical community.

W. G.

**32[4, 13.05].**—Fred Brauer & John A. Nohel, *Ordinary Differential Equations, A First Course*, W. A. Benjamin, Inc., New York, 1967, xvi + 457 pp., 24 cm. Price $12.75.

This is a text for an introductory course in ordinary differential equations, designed for students with no previous experience in the subject. Chapter 1 uses some typical mechanical systems to motivate the study of differential equations. Chapter 2 brings elementary methods of solution, including Euler's method as an example of an approximate method. Chapter 3 is devoted to the general theory of linear differential equations, while Chapter 4 concentrates on linear second-order equations, and presents a detailed treatment of solutions in power series, including a study of Bessel's equation, and an introduction to asymptotic expansions (arising naturally in connection with irregular singular points). Chapter 5 discusses boundary value problems, proceeding from elementary examples to general Sturm-Liouville problems. Up to this point, the material can be mastered by students with no background in linear algebra. A knowledge of the elements of vector algebra will be needed for Chapter 6, which deals with systems of linear and nonlinear differential equations, and briefly with the qualitative theory of autonomous systems. The basic existence and uniqueness theorems, as well as theorems on the continuous dependence on initial data and parameters are proved in Chapter 7, both for single differential equations and systems of differential equations. Chapter 8 gives an introduction to numerical methods with a good discussion of error accumulation. Chapter 9, finally, is on Laplace transforms and their use for solving initial value problems for linear differential equations. There are numerous exercises, some scattered throughout the chapters, others collected at the end of each chapter.

While maintaining a high standard of mathematical exposition, the authors have succeeded in blending theory with applications so as to impart to the student an appreciation not only of the mathematical coherence of the subject, but also of its usefulness as a tool to "explain and help him understand various physical phenomena in the physical world".

W. G.

33[5].—DONALD GREENSPAN, *Lectures on the Numerical Solution of Linear, Singular, and Nonlinear Differential Equations*, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1968, 185 pp., 26 cm. Price $6.95.

This book is a survey of numerical methods for the solution of differential equations, based on the author's lectures at summer conferences at the University of Michigan. According to the preface, "Scientists and technologists should be able to determine easily from the text what the latest methods are and whether those methods apply to their problems". There are 486 references that "will enable teachers to adapt the material for classroom presentation".

The reviewer would hesitate very much to use this book as a textbook or to suggest it as reading for applied scientists asking for advice on numerical methods. The material is quite specialized, and only a few methods are discussed. No proofs are given. In the discussion of elliptic problems, the problem of convergence and accuracy is not even mentioned, and the reader is left without any guidance as to why one difference approximation might be preferable to another. Instead, a lot of space is taken up by a detailed and repetitive discussion of how the replacement of differential operators by finite differences leads to systems of algebraic equations. Frequently, numerical values for the coefficients are given for some specific mesh-size.