possesses certain advantages over the Wiener-Hopf method.

The remaining chapters, which are devoted to shell theory, have been extensively rewritten, and there is an additional chapter on the derivation of the equations of shell theory from the general equations of classical elasticity by asymptotic expansions.

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Dynamic plasticity, by N. Critescu. North Holland Publishing Company, 1967; distributed in North America by John Wiley and Sons (Interscience). xi + 614 pages. U.S. $25.

This book, which is Volume 4 of the North-Holland series in Applied Mathematics and Mechanics, is a greatly expanded edition of the author's earlier work, Dynamic Problems in the Theory of Plasticity, published in 1958. It develops the theory controlling the propagation of disturbances in various types of plastic media. The difficulties peculiar to this subject which are due in part to the inherent non-linearity and irreversibility of plastic deformation, are brought clearly into focus in the second chapter of the book, which discusses longitudinal waves in thin rods. Later chapters introduce more complicated wave propagation problems associated with strings, circular membranes and thick rods. There is a chapter each on shock waves and axisymmetric problems and the book concludes with an account of waves propagated in soils which includes a discussion of various kinds of pressure density laws, yield conditions, and stress-strain relations. The "plastic-gas" model is used to analyse the effect of a cylindrical explosion in an infinite medium and several other problems are worked out as illustrations of various other models. These include the propagation of a spherical shock in a sandy medium and the rectilinear propagation of plane waves into the ground due to a blast wave at the surface.

The book is claimed to be reasonably self-contained but it would be necessary for the reader to be familiar with at least the elements of the theories of elasticity and plasticity as well as with the method of characteristics as applied to the quasi-linear systems. In general, analytic methods of integration are inapplicable and it is necessary to treat initial and boundary problems by numerical techniques. In fact, such methods are essential since even the simplest problems are incapable of solution by existing analytical tools. In addition, the author has devoted much space to the description of experimental results, since in a subject of this kind the physical processes are not always clearly defined and theoretical work must be guided by and tested against these results.

This book is an excellent introduction to a vigorous and rapidly developing branch of modern applied mathematics.

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Basic equations and special functions of mathematical physics, by V. Ya. Arsenin (Translated by S. Chomet). Iliffe Books Ltd., London, 1968. 361 pages.

One of the unfortunate necessities in the development of applied mathematics has been that an undergraduate student is invariably in his senior year before he is exposed to linear partial differential equations. This subject continues to develop a way of thinking, but it is still removed from the majority of physical phenomena that are essentially non-linear. This approach has become a necessity

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as much time is taken in the earlier years gaining a mastery of certain tools from analysis before the student embarks on a study of partial differential equations that does not sacrifice the rigour his earlier training leads him to demand. Nevertheless, most of the material is well within the capabilities of honours students in their junior years, and with careful planning, standards of preparation need not be compromised. An advantage of the text under review is that its presentation does facilitate its introduction at such a time, for it requires a knowledge of multivariate analysis and ordinary differential equations that can be gained by a student after two years at university. When he uses the text concurrently with a course in complex variables the student will be ready to understand the development of special functions that comprise the last third of the book.

The material covered in Part 1 is as follows: formulation of p.d.e. and their classification with solutions by the method of characteristics, Green's functions, and separation of variables with the theory of eigenfunction expansions; potential theory; integral equations. Part 2 covers Bessel functions, spherical harmonics, Hermite and Laguerre Polynomials. The style of presentation is very similar to that used by such earlier Russian authors as Petrovskii, Tychanov and Samarski in their texts; although these texts are used by physics and engineering science students in Russia, there is no lack of mathematical detail. One main difference here is that the concept of generalized functions, adequately introduced in an appendix, is used throughout. Also, only elementary functions plus the error function are used to illustrate the theory in the first part; this avoids departing from the main argument of the theory to develop particular properties, though it does thereby limit the range of examples considered.

Particular criticisms can be made: there is no mention of integral transforms, which are certainly powerful tools in the solution of the heat conduction equation. The short chapter on the derivation of partial differential equations is somewhat brief and, in places, misleading when the physical assumptions required are not even mentioned. This section would need to be supplemented. Further, although all the theorems required in the logical development of the subject are stated, on occasion this is done without proof (e.g. the existence of an infinite set of eigenvalues for a regular Sturm-Louiville system). This is understandable; however, (in the translation at least) no mention is made of where a suitable proof can be found, so that the reader is left unaware of the intricacies involved. In fact, there is only a list of a dozen (standard) texts in English to serve as references; the job of translation, it seems, should include filling in such gaps in more detail if the books are to be helpful for students.

There are a number of problems at the end of each chapter. The translation is good and there are few misprints, though in places there is confusion over notation (e.g. both $\nabla^2\phi$ and $\Delta\phi$ are used to represent the Laplacian of the function ϕ, while $\nabla^2 x$ is also used to represent an increment $x_2 - x_1$). To conclude, this book can definitely be recommended to the student, not necessarily as the basic text, but certainly as collateral reading. It will put him in contact with the excellent style of many of the present Russian authors.

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Lectures on the numerical solution of linear, singular and nonlinear differential equations, by D. Greenspan. Prentice Hall Inc., 1968. 185 pages. U.S. $6.95.

This book is based on lectures given by the author at a series of summer