BOOK REVIEW

V. ARPACI: **Conduction Heat Transfer.** 550 pp. Addison Wesley (1966). Price 140 s.

A NEW book on heat conduction will come as a surprise to many engineers, physicists and mathematicians who work in this field and who believe all that could be said, has been said by Carslaw and Jaeger. The author is aware of the possibility of this reaction, and in partial answer, states in his preface that, "this text is intended, not to serve as an additional catalogue of a number of new situations which are not listed in Carslaw and Jaeger, but rather to introduce the reader to engineering conduction".

The book is set out in three sections dealing with: a formulation of terminology and the various equations; general methods of solution; and more particular methods of obtaining solutions. The first section—Lumped Integral Differential Formulations—presents the equation of conservation of mass and the laws of thermodynamics in various forms, relates them to Fourier's law and obtains the various forms of the heat-conduction equation. The section includes a discussion of possible boundary conditions and of the methods of formulating particular problems. Most of the material in the second and third sections is available from other texts and, indeed, can be

found between the covers of several books. What then has the author achieved by writing this text? The most obvious answer to this question is that the chapters dealing with Laplace Transforms and Variational Methods contain considerably more material on these subjects than is found in alternative heat-conduction texts. The main achievement, however, is the author's clear presentation of the mathematical methods used to solve the relevant equations. The author has used a mathematical framework for his book, presenting at length the mathematical methods and only subsequently relating these methods to physical problems. The physical problems are presented in the form of worked examples and are spread liberally throughout the text.

The principal users of this book are likely to be graduate students in engineering who have a sound general mathematical knowledge and who are prepared to work with a book which does not conform to the usual pattern of texts in this field. The user will not find terms such as "infinite body, semi-infinite body, heat source, similar solution" or even "error function" in the index and they are not easy to find in the text. Also lacking are property data and the usual tabulated functions. The book contains many useful homework problems.

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