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# BOOK REVIEW

## Perturbation Methods in Heat Transfer

A. Aziz and T. Y. Na

The authors have produced a volume that they assert is both 'a textbook and an up-to-date reference' on perturbation methods applied to heat transfer problems. The book was published in 1984 and the most recent reference cited is 1982, so the last claim may be justified. I am less certain of the value of the work as a textbook, but it may be a useful reference in some cases. The subject matter of the book places it beyond most undergraduates and all but a few beginning graduate students. A background in heat transfer and fluid mechanics is definitely needed.

Following an introductory chapter, the authors take up, in turn, regular and singular perturbation expansions, the method of strained coordinates, the method of matched asymptotic expansions, and techniques for improving the range of convergence of perturbation series. A bibliography of heat transfer literature in which perturbation techniques have been used completes the book.

As a rule, the mathematical analysis for a particular topic is introduced through an example with no particular physical significance. This is followed by several analyses of heat transfer problems that have been treated in the literature. In most instances, perturbation parameters are introduced without either mathematical or physical explanation and the reader is left to speculate on how they came about. Frequently, the problem statements are incomplete. Only rarely do the authors provide a physical interpretation of the parameters or the results. Occasionally, the interested reader will be forced to consult an original reference for this interpretation, for a clear problem statement and to check for errors that have been introduced. Heat transfer is a field where physical explanations can be used to enrich and explain a mathematical analysis. I am disappointed that the authors chose not to do so.

The text is generally clear, but it is replete with awkward grammatical constructions. The inappropriate use (or absence) of definite and indefinite articles causes some confusion.

The ordering of topics is good and the coverage is generally adequate. I believe that many readers will find this book a useful starting point for a more detailed study of perturbation methods. The references and the bibliography are complete enough so additional material can be located easily.

R. Eichhorn
University of Houston,
Texas, USA

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