# BOOK REVIEWS

Selection of books for review is based on the editor's opinions regarding possible reader interest and on the availability of the book to the editor. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

## Perturbation Methods in Heat Transfer

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| *Authors* | A. Aziz and T. Y. Na |
| *Publisher* | Hemisphere Publishing Corporation (1984) |
| *Pages* | 199 |
| *Price* | $37.50 |
| *Reviewer* | B. D. Ganapol |

The title *Perturbation Methods in Heat Transfer* is somewhat misleading. Neither the subject of perturbation methods nor of heat transfer is treated in any great depth. Instead the authors present many case studies dealing with heat transfer problems that lend themselves to solution by perturbation techniques. The authors' treatment is not particularly mathematically oriented nor is it physically descriptive.

The fundamental concepts of regular and singular perturbation expansions are presented by example without mathematical justification or motivation. While this kind of presentation may be an appropriate learning technique, especially for engineers who are not interested in the mathematical rigor, it does not promote understanding. For example, it is not made clear why in some instances the small parameter raised to a nonintegral rather than an integral power is used. If one is to fully understand this technique and apply it to other physical problems, a more detailed recipe is required than is provided. Heat transfer only enters through the examples used to demonstrate the perturbation techniques. The physical processes are not at all described and no physical insight is given. The reader is expected to be knowledgable in the equations of heat transfer and fluid flow.

The final chapter is devoted to a mathematical investigation of the perturbation expansion and presents some powerful methods for improving series convergence such as the Euler and Shanks transformations. The important point that these series may on occasion be asymptotic is not discussed, however.

The book is, in my opinion, best suited to graduate students in applied mathematics who have studied both heat transfer and fluid flow in depth and have had an introduction to perturbation techniques. For the practicing nuclear technologist, this book is certainly not a must but would make interesting reading for those who wish to improve upon their numerical skills.

As a final note, I bring to the reader's attention that the authors overlooked an extremely powerful method of extending their results to higher order expressions. By the use of symbolic manipulating languages such as REDUCE and MACSYMA, the algebraic detail of generating higher order expansions is easily performed. In addition, FORTRAN code can be written directly to file, thus eliminating the need for programming assistance. Hopefully in the next edition, perturbation methods coupled with symbolic manipulation will be considered.

*Dr. Ganapol received his PhD from the University of California at Berkeley in 1971 and was employed by the Swiss and French governments during the following three years. Upon returning to the United States, he went to work at Argonne National Laboratory in the fast reactor safety group. Dr. Ganapol's interests are numerical methods development in fast reactor safety and analytical and numerical particle transport theory. He has written 100 articles on these subjects and is currently writing a book on analytical benchmark solutions in transport theory.*

## Symmetries in Nuclear Structure

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| *Editors* | K. Abrahams, K. Allaart, and A. E. L. Dieperink |
| *Publisher* | Plenum Press (1983) |
| *Pages* | 301 |
| *Price* | $47.50 |
| *Reviewer* | N. V. V. J. Swamy |

This work is essentially the proceedings of the Fifth International Summer School on Nuclear Physics organized by the Netherlands' Physical Society in the second half of August 1982. The theme of the summer school was symmetry in nuclear physics, and the book contains a collection of lectures given by invited speakers.