
Book reviews

Annual Review of Numerical Fluid Mechanics and Heat Transfer. Volume 1

Edited by T. C. Chawla

New York: Hemisphere Publishing Corp., 1987.
Pp. 454. \$149.95

The rapid increase in the number of publications that describe the use of numerical techniques for solving fluid mechanics and heat transfer problems, which appear in a large number of different technical journals and conference proceedings, provided the motivation for initiating an annual book series on state-of-the-art survey reviews.

This initial volume contains eight invited review articles, five of which deal with numerical techniques and three of which describe physical modeling of specific phenomena. The titles of the articles and their authors are:

1. Thermal Radiation in Particulate Media with Dependent and Independent Scattering—C. L. Tien and B. L. Drolen
2. Pressure-Velocity Coupling in Incompressible Fluid Flow—G. Comini and S. del Giudice
3. New Explicit Methods for the Numerical Solution of Diffusion Problems—D. J. Evans
4. Numerical Methods for One-Dimensional Reaction-Diffusion Equations Arising in Combustion Theory—J. I. Ramos
5. Buckling Flows: A New Frontier in Fluid Mechanics—A. Bejan
6. Numerical Methods for Multidimensional Radiative Transfer Analysis in Participating Media—S. H. Chan
7. Fundamental Aspects of Analytical and Numerical Methods on Freezing and Melting Heat-Transfer Problems—S. Fukusako and N. Seki
8. Complex Heat Transfer Processes in Heat-Generating Horizontal Fluid Layers—F. B. Chung and T. C. Chawla

The depth of coverage in these articles ranges from an extremely detailed development and discussion of a particular technique (Evans) or phenomenon (Ramos, with 408 references) to an almost superficial treatment of the subject (Comini and del Giudice). Those interested in radiation may find the first and fifth articles nicely written and of interest. The last two articles in the volume contains surveys of specific phenomena.

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Computational Heat Transfer

By Y. Jularia and K. E. Torrance

New York: Hemisphere Publishing Corp., 1987.
Pp. 366. \$49.00

This book deals with the numerical solution of conductive, convective, and radiative heat transfer problems. Part 1 presents a brief discussion of the governing equations. The finite difference approximation of both the steady state and transient form of the diffusion equation is then introduced. Truncation errors, convergence, and stability are discussed. This part concludes with the presentation of the basic theory of the finite element method.

Part 2 deals with the matching of the computational method to the physics of the problem. Each of the basic modes of heat transfer is discussed individually. Both the stream function and the vorticity and primitive variable formulation of the conservation equations are discussed. The special treatment given inviscid, creeping, boundary layer, and recirculating flow is discussed. The use of numerical methods with radiosity, absorption factor, discrete integrals, and the Monte Carlo methods for radiation heat transfer are presented.

Part 3 describes the application of the previously discussed techniques to the analysis and simulation of thermal systems in manufacturing and the environment.

The broad spectrum of problems discussed in *Computational Heat Transfer* makes it quite helpful for those working in thermal engineering who wish to become acquainted with numerical techniques. The major emphasis of the book is on finite difference techniques, although other methods are introduced. If the reader must solve complex problems, other books dealing with the specific method in more detail should be consulted, particularly if the solution technique uses finite elements.

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Fundamentals of Heat Exchanger and Pressure Vessel Technology

By J. P. Gupta

New York: Hemisphere Publishing Corp., 1987.
Pp. 607. \$45.00

The title of the book is misleading. A more accurate title would be *A Glossary of Heat Exchanger and Pressure Vessel Terminology*.

I am unsure as to the author's planned audience. The explanations of the various terms are generally very good. The book, however, does not give sufficient details and examples to be of value to the designer and those involved in the mechanical analysis of heat exchangers and pressure vessel designs. And there are numerous other texts that do a far superior job, in my opinion. The value of the book is thus limited to those wishing only to familiarize themselves with the terminology used in this industry.

Carl F. Andreone, P.E.

Stone and Webster Engineering Corporation
Boston, MA, USA

Handbook of Radiative Heat Transfer in High-Temperature Gases.

Edited by R. I. Soloukhin

New York: Hemisphere Publishing Corp., 1987.
Pp. 309. \$95.00

This book is aimed at researchers who are involved with the modeling of radiative transfer in high-temperature gases or plasmas, which is important in such fields as the reentry of