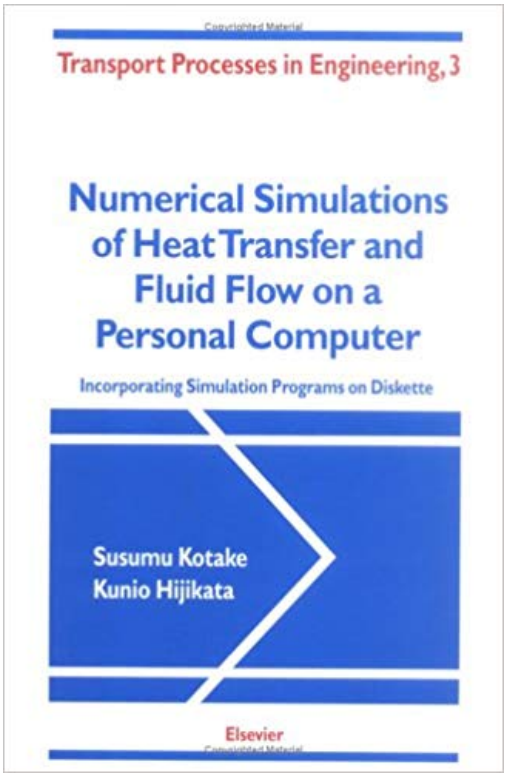
Numerical Simulations of Heat Transfer and Fluid Flow on a Personal Computer, Volume 3: Incorporating Simulation Programs on Diskette (Transport Processes in Engineering)

by **S. Kotake,K. Hijikata**



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This book describes methodologies for performing numerical simulations of transport processes in heat transfer and fluid flow. The reader is guided to make the proper selection of simulation techniques and to interpret the acquired results based on the flow physics involved. Computer programs which are used to solve heat transfer and fluid flow problems are integrated into the text. Illustrative examples of thermo-fluid phenomena are provided in every chapter to enhance understanding of the subjects by offering the reader hands-on experience of numerical simulations.

Most of the fundamental transport processes in heat transfer and fluid flow, e.g. heat conduction in a solid body, convection heat transfer of a fin, laminar and turbulent heat transfer and flow in a duct or tube, and boundary layers over a flat plate are covered. A strong emphasis is placed on examinations of the thermo-fluid phenomena inside a flow passage (such as tube and a channel). The book contains detailed discussions on the formulation of the boundary conditions which is often the key issue in making successful numerical simulations of the physical phenomena of interest.

Simulations are carefully designed so that conventional 16-bit personal computers, such as IBM PC® or Apple Macintosh® can be used. Visualizing the simulated results in graphic form (plotting charts and line contours of physical variables) significantly enhances the reader's understanding of the important transport processes. The book is intended as an introductory text for numerical simulations of heat transfer and fluid flow phenomena. Description is simple and self-contained so that beginners can easily understand the material, yet it will also serve as a useful reference work

for the practitioner. Exercise problems are supplied by which the reader can consolidate knowledge of simulation techniques described and gain further insight in the physical processes of interest.

The book contains two 3½ inch floppy disks, each of which stores a complete set of simulation source codes discussed in the text. These programs are recorded in ASCII format and can be run either on IBM PC® or Macintosh® using QuickBasic®. The programs are well-documented within the text as well as in the codes themselves with a number of comment statements. This helps the reader understand the flow of program runs and, if the reader so wishes, modifying the original source codes. To facilitate prescription of the physical conditions for simulations, these programs run in a highly interactive mode. In addition, the diskettes contain a number of compiled programs which can be executed without the QuickBasic® program.

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