

## REVIEW

### A Review of The Proceedings of The First International Conference on Advanced Computational Methods in Heat Transfer

July 1990, Portsmouth, U.K.

THE PROCEEDINGS of the first International Conference on Advanced Computational Methods in Heat Transfer, are edited by L. C. Wrobel, C. A. Brebbia and A. J. Nowak and are published by Computational Mechanics Publications, Southampton, U.K. These are available in three volumes, each volume dealing with specific areas in heat transfer.

The heat transfer problem is essentially very complex in nature due to its unsteady nature and nonlinear feature. The solution of such problems involves coupling of different types of equations governing the process and solving them by suitable numerical methods. The computers are of tremendous help while solving such a complex situation with improved accuracy and lower computational time. The use of such computational methods with their pros and cons is precisely the core of these proceedings.

#### *Volume 1: Heat conduction, convection and radiation*

This volume contains five sections: heat conduction, radiative heat transfer, convection-diffusion, inverse problems and numerical and computational techniques, with a total of 35 papers.

There are few papers on heat conduction for objects like cylindrical shells, pipes (both vertical and horizontal), tanks, etc. It covers different numerical methods namely Integral Transform Solution and Graphical Mapping Techniques for diffusion problems, solution of heat conduction by FEA, Finite Element and Boundary Element Methods as well as some multidimensional approach.

The radiation section includes numerical models for flow through tubes for different media, use of computational methods like BEM, matrix inversion methods and some of the experimental results for certain applications.

Some papers discuss the use of inverse problem methods for the heat conduction and for the evaluation of the heat transfer coefficient.

Various numerical/computational methods for different applications are discussed in the last section, with their merits and demerits.

#### *Volume 2: Natural and forced convection*

This volume specially deals with convective heat transfer, with a total of 32 papers.

The equations governing the flow and the heat transfer, in the convection process, for objects like vertical and horizontal plates, cylinders, deep water reservoirs, etc. are solved. Different solution methods like BEM, finite difference, etc. are employed and the experimental results for a few applications are discussed.

The other section on heat and mass transfer contains some papers on practical problems like screw extrusion process, absorption refrigeration units, etc.

#### *Volume 3: Phase change and combustion simulation*

Forty-three papers on different heat transfer applications form the contents of this volume. These application-oriented papers should be of interest to the concerned scientists working in the respective areas.

There are some metallurgy-based papers regarding the heat transfer during casting, melting, hardening and solidification. Even if adequate papers are dealing with the numerical computation, very few papers talk of the experimental side of the problem.

The combustion section deals with the heat transfer in the furnaces (by way of mathematical models), boilers, burners, etc. The use of such tools is described for heat exchanger application, heat transfer in electronic systems and for the parametric studies as well as optimisation of the relevant parameters. Some applications like nuclear reactors, turbines and air cooled diesel engines are touched upon with the use of the different numerical methods.

Even if most of the heat transfer applications are covered in this conference, very few papers talk about the experimental results. There should be validation of the computer results and comparison of various numerical methods for the applications, which will enable the researchers to select the optimum numerical method for their application.

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