BOOK REVIEWS

Computer Aided Engineering Systems Handbook
Volume I and II

The first two volumes of this series of handbooks were published by a joint effort of CPM and Springer-Verlag in 1987. Editors are Puig—Pey, J. and Brebbia, C. A. Volumes are comprised of reports on commercialized CAE systems having wide field of applications in mechanical engineering design.

Systems (and system families, respectively) being included in Volume I are AUTOCAD BEASY, BRAVO, CADDSTATION, CADRAW, CAM-X, CIS-MEDUSA, COMPAC, DOODLE, DORA, EASYDRAF, EUCLID, FAM, GIFTS, HOLGUINCAD, ICEM and MENTAT. Volume II gives information on ANSYS, ANVIL, AUTO-TROL, CADVANCE, DIAD, IDEAS, INTERGRAPH, MECHANICAL ADVANTAGE, PADL-2, PALETTE, PATRAN, PAFEC, PRIME MEDUSA, PROREN, ROMULUS, SABRE, SYNTHAVISION, TIPS-1 and UNIGRAPHICS. Supposingly, many other systems, e.g. CATIA, NISA, CADdy, ASKA, etc. will be included in the next Volumes. As it is well-known, a huge number of systems are available consequently, books giving comprehensive survey are indispensable.

The systems selected are discussed in alphabetical order. To help those, who are not specialized in the different aspects of CAE systems, a brief summary is given in both of the books.

As it is stated in the Preface, the main purpose of the Editors was to support the potential users in selecting the systems, which are best suited to their particular application. To achieve this, comparative Tables are included.

General capabilities of systems are compared in the first Table. The second presents the graphical functions of the systems. Possible application areas are explored in the third one. The fourth gives the applied methods of geometric modeling. Information on characteristics of the user interface, on the programming languages and on the system interfaces are detailed in Table 5. Table 6 presents the made of the usable computer hardware. Table 7 lists names, adresses and representatives of the original developers/dealers.

The remaining parts of both Volumes deliver the reports on the systems included. Understanding of these, does not require any special computer/CAE knowledge or skill.

This series of CPM and Springer-Verlag may be a useful tool of a directed survey of the CAE system market and making decisions at selecting the relevant system (or systems). From this point of view, these handbooks can be suggested to all of the people concerned. As a matter of course, books of this promising series can be used succesfully by those non computer professionals, who are intending to get the basics of methodology and application possibilities of up-to-date CAE systems.

<div align="right">Dr. László VARGA</div>

Boundary Element Fundamentals

G. S. GIPSON

Basic Concepts and Recent Developments in the Poisson Equation

This book, published by Computational Mechanics Publications (Southampton, Boston), is a part of series "Topics in Engineering" (edited by C. A. Brebbia and J. J. Connor).

The first three chapters of this book describe the theoretical basis of BEM especially for problems governed by Laplace and Poisson equations.

The following part (Chapter 4 and 6) gives several theoretical examples (insulated heating duct, concentric spheres, hollow cylinder, multiply-connected region, composite sphere, subsurface flow problem, a field ion microscope, square plate with internal heat generation, orthotropic material properties, shaft with an eccentric hole, circular shaft with a radial crack, etc.) in the field of Laplace—Poisson type equation. Chapter 5 contains an attempt for explicit domain discretization in the general Poisson equation, based on Monte Carlo quadrature.

The last part of this text presents a computer program for the solution of the two-dimensional and the axisymmetric Poisson's equation in piecewise non-homogeneous media with linear elements. The program is written in VAX FORTRAN and designed to handle general 2D and axisymmetric geometries with potential value and flux boundary conditions specified. The documentation contains a description of the program in sufficient detail.

Boundary element method seems to be rival the finite element method in the next decade, while BEM is less understood, known and applied by engineers. Probable BEM needs more knowledge of computational mechanics.

Dr. László VARGA

The Boundary Element Reference Book

Editors: J. Mackerle and C. A. Brebbia

The reference book was jointly published by Computer Mechanics Publications (Southampton, Boston) and Springer-Verlag to give details of the most important publications and program codes on boundary element method (BEM).

The first part of this book deals with the history and the fundamental concepts of BEM. More than 300 references are listed and several different books, proceedings and training materials are revied.

The main part of this reference book provides detailed information on the available boundary element softwares.

This section is divided into six parts:
* Codes for Heat Transfer and Potential Problems.
* General Purpose Programs.
* Special Purpose Programs.
* Coupled BE/FE Programs.
* Pre- and Post-Processing Codes.

Four tables summarize the capabilities of each code (range of applications, type of program, pre- and post-processing capabilities, elements, etc.).

The description of codes contains useful information on program capabilities, application fields, etc. These programs are used for different purposes (as educational-, research-, and professional tools), the level of their documentation is different.

The aim of the editors, collecting and publishing information on BEM literature and codes, should play an important role by demonstrating the natural advantages of boundary element method over the other numerical methods.

Dr. László VARGA