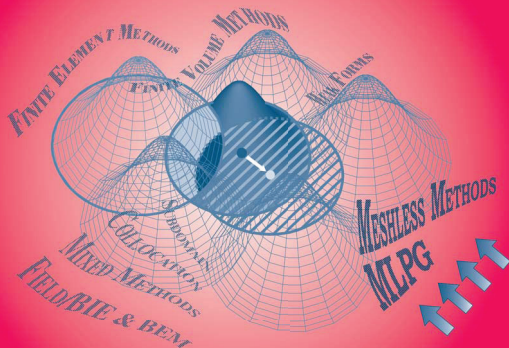


METHODS OF COMPUTER MODELING IN ENGINEERING & THE SCIENCES

VOLUME I
Satya N. Atluri



METHODS OF COMPUTER MODELING IN ENGINEERING & THE SCIENCES VOLUME I by Satya N. Atluri

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The last 3 decades of the 20th century saw the intense development of the new discipline, then commonly known as Computational Mechanics. The two methods of computational mechanics that were widely developed were the Finite Element Method (FEM) and the Boundary Element Method (BEM). A large number of books were written, dealing exclusively with either the FEM or the BEM. In this century, the discipline has undergone a radical enhancement, leading to the more general paradigms of Modeling & Simulation Based Engineering, and Computer Modeling in Engineering & the Sciences.

The present book is on the evolving discipline of Computer Modeling in Engineering & the Sciences. It presents, for the first time, *a unified treatment of a variety of computer modeling strategies*, including: Collocation Method, Sub-domain Method, Finite Volume Method; Finite Element Method; Field/Boundary Element Method; The Meshless Local Petrov-Galerkin (MLPG) Method for Domain & Boundary Discretizations; Boundary Methods for certain linear problems, etc. Both Primal & Mixed Methods are presented. Linear & Nonlinear, Static & Dynamic problems; eigen-value problems of buckling and vibration; and acoustic radiation & scattering problems are discussed.

A carefully chosen sample problem is solved, throughout the book, by using the various methods, and the solutions by the various meth-

ods are compared as to their accuracy, convergence, and efficiency. MathLab or FORTRAN programs are included, to illustrate the computer solutions by a wide variety of methods listed above.

This unique book should be of great interest to graduate students, professionals, and researchers in all disciplines of engineering & the sciences.

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About the Author

Satya N. Atluri is a distinguished scholar based at UCI, where he is the holder of the Samuelli/von Karman Chair in Aerospace Engineering. He has been affiliated with a number of universities, including UCLA, Georgia Tech (Institute Professor, Regents' Professor of Engineering; and Hightower Chair Professor); Tsinghua University, Beijing (Honorary Professor); KAIST, Korea (Honorary Professor), and others.

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He is also the recipient of numerous awards in recent years, including: Distinguished Alumnus, Indian Institute of Science; The HILBERT MEDAL of ICCES; the Excellence in Aviation Award, from the U.S. Federal Aviation Administration; President's National Medal of Technology Distinguished Service Award, from the US Secretary of Commerce; Pendray Aerospace Literature Award, from AIAA (American Institute of Aeronautics & Astronautics); Structures, Structural Dynamics, and Materials Medal from the AIAA; The SDM Lecture Award, from the AIAA; Honorary Technical Editor, Aeronautics & Astronautics, Encyclopaedia of Life Support Systems, UNESCO; "Highly Cited Researcher" (one of the 100 most highly cited researchers in all branches of engineering, over the last 20 years (Institute of Scientific Information,); The Cemal Eringen Medal in Engineering Science from the Society of Engineering Science; Technical Achievement Award, from the US National Academy of Engineering; The Aerospace Structures & Materials Medal, from the American Society of Civil Engineers; "Excellence in Computational Mechanics" Medals from Greece and Japan; Fellowship from the Japan Society for Promotion of Science; The ICES Gold Medal; Doctor of Science (Honoris Causa) from Ireland; Sustained Research Award from the Society of Sigma-Xi; Distinguished Professor Award of 1986, from Georgia Tech; Outstanding Researcher Award from Georgia Tech, 1986 & 1990; Midwestern Mechanics Lecturer; Southwestern Mechanics Lecturer; and others.

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