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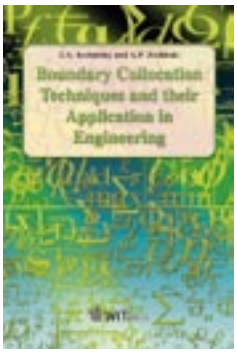

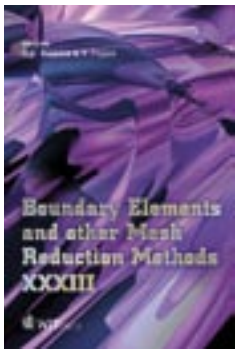

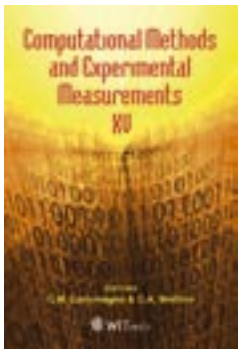

BEST SELLER

Boundary Collocation Techniques and their Application in Engineering

J.A. KOLODZIEJ and A.P. ZIELINSKI, University of Technology, Poland

Methods of mathematical modelling applied in contemporary computational mechanics can be divided into either purely numerical or analytical-numerical procedures. Purely analytical solutions have lost their popularity because of strong limitations connected with simple regions and the mostly linear equations to which they can be applied. The fundamental monographs (for example, those on elastic solids, fluid mechanics or heat exchange) are always popular and often quoted, but rather as sources of comparative benchmarks confirming correctness and accuracy of computer solutions.

This volume can be divided into two parts. In the first part is a general presentation of the boundary collocation approach and its numerous variants. In the second part the method is applied to many different engineering problems, demonstrating the accuracy and convergence of its properties. Both evident advantages and limitations of the approach are clearly presented. The observations are based mainly on investigations carried out in the last two decades by the authors and their co-operators. The monograph includes figures and tables that present results of numerical examples. Over a thousand papers and monographs concerning the discussed approach are quoted. They are listed separately in each chapter, which makes the literature survey easier to use.

ISBN: 978-1-84564-394-2
eISBN: 978-1-84564-395-9
Published 2009 / £128.00 / 336pp

Mesh Reduction Methods: BEM/MRM XXXI

Edited by: C.A. BREBBIA, Wessex Institute of Technology, Southampton, UK

The annual conference on Mesh Reduction Methods and Boundary elements (MEM/BEM) is recognised as the international forum for the latest advances of these methods and their applications in sciences and engineering. This book contains papers presented at the thirty-first conference.

ISBN: 978-1-84564-197-9
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Published 2009 / £164.00 / 432pp

Boundary Elements and Other Mesh Reduction Methods XXXII

Edited by: C.A. BREBBIA, Wessex Institute of Technology, Southampton, UK

The Conference on Mesh Reduction Methods and Boundary Elements (MRM/BEM) is recognised as the international forum for the latest advances in these methods and their applications in sciences and engineering. The book will be of interest to engineers and scientists working within the areas of numerical analysis, boundary elements and meshless methods.

The papers in the book are organised into the following sections: Fluid Flows; Damage Mechanics and Fracture; Dynamics and Vibrations; Electrical Engineering and Electromagnetics; Advanced Meshless and Mesh Reduction Methods; Advanced Formulations; Computational Techniques.

ISBN: 978-1-84564-470-3
eISBN: 978-1-84564-471-0
Published 2010 / £128.00 / 336pp

NEW TITLE

Boundary Elements and Other Mesh Reduction Methods XXXIII

Edited by: C.A. BREBBIA and V. POPOV, Wessex Institute of Technology, Southampton, UK

The Wessex Institute of Technology has been convening conferences on the Boundary Element Method since 1978. The annual conference series is recognised internationally as the premier forum for sharing the latest advances on the boundary element method and other meshless techniques and their applications, which continue to evolve and grow in importance.

Ever since the first conference took place in Southampton, UK, the success of the meeting has been an indication of the strength of the research being carried out by many different groups around the world. This continuous growth is a result of the evolution of the techniques from methods based on classical integral equations to techniques that now cover a wide variety of mathematical approaches, the main objective of which is to reduce or eliminate the mesh. The mesh, a concept inherited from more primitive methods, such as finite differences and finite elements, is alien to the solution of the problem and dictated only by the limitations of first-generation analysis techniques.

The papers presented at the latest conference, contained in this volume, will cover topics such as Advanced Meshless and Mesh Reduction Methods; Heat and Mass Transfer; Electrical Engineering and Electromagnetics; Fluid Flow; Advanced Formulations; Computational Techniques; Advanced Structural Applications; Dynamics and Vibrations; Damage Mechanics and Fracture; Material Characterisation; Financial Engineering Applications; Stochastic Modelling; Emerging Applications.

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NEW TITLE

Computational Methods and Experimental Measurements XV

Edited by: G.M. CARLOMAGNO, University of Naples, Italy and C.A. BREBBIA, Wessex Institute of Technology, UK

It is important that scientists who perform experiments, researchers who develop computer codes, and those who carry out measurements on prototypes all communicate effectively. While computer models are now more reliable and better able to represent more realistic problems, experimental measurements need to be conditioned to the requirements of the computational models. Progress of engineering sciences depends on the orderly and progressive concurrent development of all three fields.

This book contains the results of the latest in a biennial series of meetings begun in 1984 to facilitate that communication and development. The papers presented at the conference include topics such as Computational and Experimental Methods; Fluid Flow; Heat Transfer and Thermal Processes; Stress Analysis; Composite Materials; Detection and Signal Processing; Advances in Measurements and Data Acquisition; Multiscale Modelling; Ballistics; Railway Transport.

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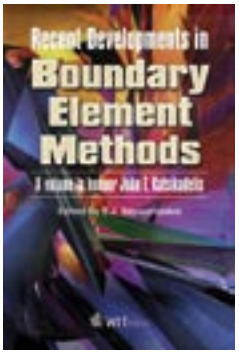
Published 2011 / £316.00 / 736pp



Recent Developments in Boundary Element Methods

A Volume to Honour John T. Katsikadelis

Edited by: ***E.J. SAPOUNTZAKIS****, National Technical University of Athens, Greece*

This book is a collection of articles contributed by colleagues, collaborators and past students to honor Professor John T. Katsikadelis on the occasion of his 70 years. Professor Katsikadelis, now an emeritus professor at the National Technical University of Athens in Greece, is one of the BEM pioneers. He started his research in this field with his PhD thesis at the Polytechnic Institute of New York in the 1970s and continues it to date.

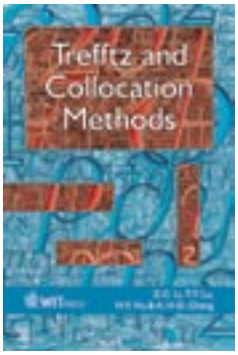
The book comprises 28 contributions by more than 45 leading researchers in Boundary Element Methods (BEM) and other Mesh Reduction Methods (MRM). All contributors are well-known scientists from North and South America, Asia, Australia, and Europe. The volume is essentially a collection of both original and review articles covering a variety of research topics in the areas of solid mechanics, fluid mechanics, potential theory, composite materials, fracture mechanics, damage mechanics, plasticity, heat transfer, dynamics and vibrations, and soil-structure interaction. Invaluable to scientists, engineers and other professionals, and graduate students interested in the latest developments of the boundary integral equation methods, the book addresses the needs of the BEM computational mechanics research community.

ISBN: 978-1-84564-492-5
eISBN: 978-1-84564-493-2
Published 2010 / £158.00 / 416pp

Trefftz and Collocation Methods

Z.-C. Li*, National Sun Yat-Sen University, Taiwan;* ***T.-T. Lu****, National Center for Theoretical Science, Taiwan;* ***H.-Y. Hu****, Tunghai University, Taiwan;* ***A. H.-D. Cheng****, University of Mississippi, USA*

This book covers a class of numerical methods that are generally referred to as "Collocation Methods". Different from the Finite Element and the Finite Difference Method, the discretization and approximation of the collocation method is based on a set of unstructured points in space. This "meshless" feature is attractive because it eliminates the bookkeeping requirements of the "element" based methods.



This text discusses several types of collocation methods including the radial basis function method, the Trefftz method, the Schwartz alternating method, and the couple collocation and finite element method. Governing equations investigated include Laplace, Poisson, Helmholtz and bioharmonic equations. Regular boundary value problems, boundary value problems with singularity and eigenvalue problems are also examined. Chapters contain rigorous mathematical proofs and many numerical experiments to support the algorithms and to verify the theory. There is also a tutorial on the applications of these methods.

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eISBN: 978-1-84564-303-4
Published 2008 / £142.00 / 432pp

Computational Methods and Experimental Measurements XIV

Edited by: ***C.A. BREBBIA****, Wessex Institute of Technology, UK and* ***G.M. CARLOMAGNO****, University of Naples, Italy*

As computer models become more reliable and able to represent more realistic problems, detailed data is leading to the development of appropriate new types of experiments. Experimental measurements are conditioned to the requirements of the computational models. Hence it is important that scientists working on experiments communicate with researchers developing computer codes, as well as those carrying out measurements on prototypes. The orderly and progressive concurrent development of all these fields is essential for the progress of engineering sciences.

This book contains papers from the Fourteenth International Conference in the well established series on Computational Methods and Experimental Measurements. These successful meetings provide a unique forum for the review of the latest work on the interaction between computational methods and experimental measurements. The papers are organised into the following topics: Computational and Experimental Methods; Experimental and Computational Analysis; Direct, Indirect and in-situ Measurements; Detection and Signal Processing; Data Processing; Fluid Flow; Heat Transfer and Thermal Processes; Material Characterisation; Structural and Stress Analysis; Industrial Applications; Forest Fires.

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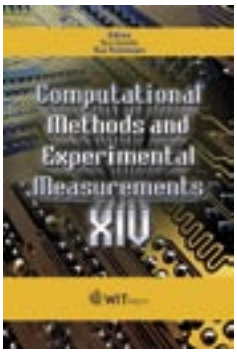
Published 2009 / £255.00 / 672pp



BEST SELLER

Biologically Inspired Optimisation Methods: An Introduction

MATTIAS WAHDE*, Chalmers University of Technology, Goteborg, Sweden*

"What is particularly valuable is that Wahde does not just present the theories, but also includes applications suitable for the presented methods. These examples help the reader to understand the extent to which the methods can be used in real-life applications. Recommended."

CHOICE, March 2009

Biologically inspired optimisation methods constitute a rapidly expanding field of research, with new applications appearing on an almost daily basis, as optimisation problems of ever-increasing complexity appear in science and technology. This book provides a general introduction to such optimisation methods, along with descriptions of the biological systems upon which the methods are based. The book also covers classical optimisation methods, making it possible for the reader to determine whether a classical optimisation method or a biologically inspired one is most suitable for a given problem.

The book is primarily intended as a course book for students with a background covering basic engineering mathematics and elementary computer programming. Each method is illustrated with several basic examples, as well as more complex examples taken from the research literature, followed by several exercises, ranging from basic theoretical questions to programming examples. While theoretical results are presented, the book is mainly centered on practical applications of the optimisation methods considered.

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eISBN: 978-1-84564-344-7
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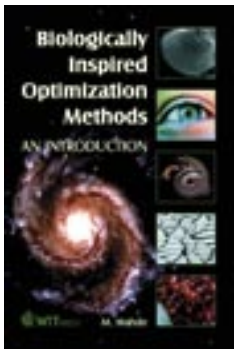

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