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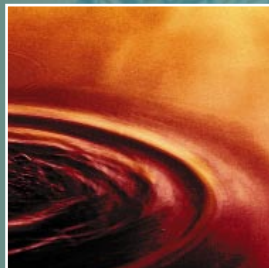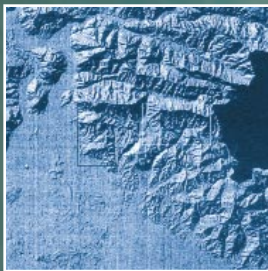
Book 2000 and Software Catalogue

- Acoustics
- Aerospace Engineering
- Architecture
- Artificial Intelligence
- Bioengineering
- Boundary Elements
- Computing & Software
- Earthquake Engineering & Soil Dynamics
- Electronic & Electical Engineering
- Environmental Engineering
- Fluid Mechanics
- Fracture Mechanics
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WIT Press
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Dear Colleague,

Welcome to WIT Press's 2000 catalogue which features details of forthcoming publications, together with our extensive list of new and established books and software.

This year sees the launch of two major new international book series, *High Performance Structures and Materials* (p49), established to document the dynamic and rapid changes presently happening in structural engineering, and *Design in Nature* (p8) which provides in depth coverage of such topics as mathematics in nature, evolution, and natural selection.

In the *Advances in Architecture Series* (p3) there are new titles on **The Revival of Dresden**, the **Structural Design of Retractable Roof Structures**, and **Computational Acoustics in Architecture**, while the **Earth Construction Handbook** will appeal to a wide audience including engineers, architects, builders, planners, craftsmen and laymen who wish to construct cost-effective buildings with a healthy, balanced indoor climate.

The well-regarded *Advances in Earthquake Engineering Series* (p17) sees four additions with **Wave Motion in Earthquake Engineering**, **Stochastic Structural Dynamics, Seismic Isolation** and **Dynamic Structural Design**.

We are also continuing to add to our fatest growing area, Environmental Engineering, with seven new titles in the *Advances in Ecological Sciences Series* (p20), while **The Sustainable Street** and **The Sustainable City** (p22) explore best policy and practice for viable urban environments in the new millennium from a multidisciplinary perspective.

WIT Press's main focus continues to be on books for post-graduate students, researchers and professionals. However, this year we have several new texts written with the undergraduate in mind. These include **Linear Elastic Fracture Mechanics for Engineers: Theory and Applications** (p37) which fulfills the need for a short, modern introduction to this topic, and **Mathematical Methods: With Applications** (p46) which provides a unique and accessible guide to the application of differential equations to physical problems.

There will also be additions to our established lists in such fields as Aerospace Engineering, Bioengineering, Boundary Elements, Fluid Mechanics, Heat Transfer and Transport Engineering.

As in last year's catalogue, we are offering you the opportunity to purchase selected Backlist titles (p55) at 50% discount. Ordering any WIT Press is easy - simply fill in the Order Form at the centre of this catalogue and return it to us. Alternatively you may also phone, fax or e-mail your order, or place it using the encrypted Order Form on our web site.

We look forward to hearing from you.

Yours sincerely

Helen Arnold   Dee Halzack
Marketing Co-ordinator,   Marketing Manager,
WIT Press, UK   Computational Mechanics Inc., USA

PS Please note that to the best of our knowledge our software products, which appear throughout this catalogue, are Year 2000 compatible.

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E-Mail: witpress@witpress.com

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WIT Press is a major publisher of engineering research. The company prides itself on producing books by leading researchers and scientists at the cutting edge of their specialities, thus enabling readers to remain at the forefront of scientific developments.

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Wessex Institute of Technology - Centre of Excellence in Engineering Research, and
BEASY - producer and provider of software solutions for engineering analysis.

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This catalogue will also be available on CD-ROM. To obtain a copy in this format please fill in the appropriate section on the enclosed Order Form and return it to us. Alternatively you may send your request by phone, fax or e-mail.

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Please note that at the time of going to press, we are unable to confirm final prices and page extents for some of our 2000 titles. The information given is therefore approximate (**indicated as apx**) and subject to change on publication.
All prices for published titles are correct at the time of going to press but subject to change without notice.

NEW

Boundary Element Acoustics
Fundamentals and Computer Codes

Editor: **T.W. WU**, *University of Kentucky, USA*

Using this unique tutorial readers will not only become familiar with the basic principles of the BEM in acoustics, but will also be able to gain hands-on experience by constructing computer codes for a wide range of problems in the field.

The first text to provide source codes on such a wide range of BEM formulations in acoustics, this book will be ideally suited to researchers, engineers and graduate students. A CD-ROM providing FORTRAN codes is also included.

Contents: Fundamentals of Linear Acoustics; The Helmholtz Integral Equation; Two-Dimensional Problems; Three-Dimensional Problems; The Normal-Derivative Integral Equation; Indirect Variational Boundary Element Method in Acoustics; Acoustic Eigenvalue Analysis by Boundary Element Methods; Time Domain Three-Dimensional Analysis; Extended Kirchhoff Integral Formulations.

Series: Advances in Boundary Elements
ISBN: 1-85312-570-9   2000
apx 250pp + CD-ROM   apx £95.00/US$149.00

Lecturers - Price reductions are available when you purchase multiple copies of this text. Please contact the Marketing Department at WIT Press for details.

NEW

Boundary Elements in Acoustics

Editor: **O. VON ESTORFF**, *Technische Universität Hamburg-Harburg, Germany*

In recent years the application of Boundary Element Methods to acoustical problems has gained much popularity. The methodology is particularly effective and accurate if sound radiation and unbounded acoustic media are involved.

Bringing together chapters from leading university teachers and researchers, as well as researchers in industry, this book provides state-of-the-art reports on all aspects of BEM calculations in acoustics. Special attention is paid to efficiency and accuracy issues, frequency and time domain procedures, direct and indirect formulations, and hybrid as well as inverse techniques. Emphasis is also placed on applications in different fields, such as vehicle acoustics, engine noise, electroacoustic transducers, optimization of musical instruments, environmental protection, and underwater acoustics.

Series: Advances in Boundary Elements
ISBN: 1-85312-556-3   2000   apx 400pp
apx £128.00/US$198.00

NEW

Active Noise Control
Volume 1 - Physical Acoustics and Active Sound and Vibration Control

G. ROSENHOUSE, *Technion-Israel Institute of Technology, Haifa, Israel*

Active Noise and Vibration Control (ANVC) has to serve disciplines as diverse as civil, mechanical and aeronautical engineering. Lack of understanding and visualization of its consequences may lead to undesired results. This first volume of **Active Noise Control** pays special attention to this aspect. The author also expands the concept of ANVC in a way that allows for an overwhelming amount of applications within the ANVC frame, and goes far beyond the basic definition of Lueg in 1933. In this way ANVC couples with other areas of physics, such as sonoluminescence, thermodynamics, magnetism and also with areas of biology, such as animal sonars and tinnitus. Such possibilities promote ANVC to unexpected heights and provide fascinating future prospects.

- Features a review of state-of-the-art practice together with more than 1,000 references.
- Summarizes basic linear and nonlinear equations and sound wave analysis and their connections to ANVC.
- Links the material world, including its non-uniformities and boundaries, and ANVC, thus stimulating development of a large amount of topics.

Volume 1 - ISBN: 1-85312-373-0;
1-56252-297-3 (US, Canada, Mexico)   2000
apx 615pp   apx £175.00/US$279.00

Also planned...
Volume 2 - Information and Control Theories and Active Sound and Vibration Control
Volume 3 - Applications of Active Sound and Vibration Control
For further details, when available, please contact the Marketing Department at WIT Press.

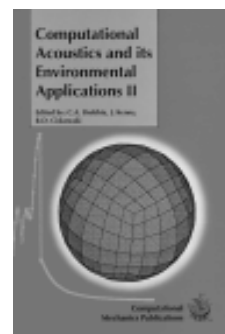## Computational Acoustics and its Environmental Applications II

Editors: **C.A. BREBBIA**, *Wessex Institute of Technology, UK*, **J. KENNY**, *University of Perugia, Italy* and **R.D. CISKOWSKI**, *IBM Corporation, USA*

Simulation of acoustic behaviour is essential for the design of a wide range of products and living spaces and the prediction of noise in the environment. Computers provide a unique tool for the analysis and design of these problems and have become instrumental in achieving optimum solutions.

This book contains the proceedings of the Second International Conference on Computational Acoustics and its Environmental Applications. The papers, which come from leading experts in both academic research and industry, are divided under the following headings: Numerical and Computational Techniques; Aero-Acoustics; Building Acoustics; Wave Propagation; Sound Systems Design and Experiment.

ISBN: 1-85312-459-1   1997   240pp
£88.00/US$138.00

Computational Acoustics and its Environmental Applications

Editor: **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

The edited proceedings of the First International Conference on Computational Acoustics.
Partial Contents: Industrial Noise and Vibrations; Computational Aero-and Hydro-Acoustics; Ambient Noise Problems; Underwater Acoustics; Building Acoustics; Noise in the Marine Environment; Sound Absorption Materials; Numerical and Computational Techniques.
ISBN: 1-85312-308-0; 1-56252-232-9
(US, Canada, Mexico)   1995   304pp
£84.00/US$129.00

Titles of Related Interest

Computational Acoustics in Architecture...p5

NEW

Ekranoplanes
Controlled Flight Close to the Sea

A. NEBYLOV, St Petersburg State University, Russia and *P.A. WILSON, University of Southampton, UK*

This book is dedicated to the problem of flight control over the sea at low altitudes, and is concerned particularly with Ekranoplanes: a new breed of craft which use low resistance of ground effect flight.

Under low flying conditions radar sensors measuring altitude, tilt and velocity of craft trace the variable profile of wave disturbance practically without averaging, thus making it difficult to gauge the motion parameters in relation to the undisturbed level of the sea surface. It is necessary to combine radar with other sensors in order to provide high accuracy. Translated from the original Russian, this volume will be of great interest to specialists in aviation and marine instrumentation, and to researchers and designers of control systems for ekranoplanes, hovercraft, hydrofoils, helicopters, special purpose aircraft, search-and-rescue craft and other types of transport designed for motion close to the sea. A video on CD-ROM showing various versions of the Ekranoplane in flight and general operation is included.

Contents: Transport Vehicles for Motion Close to Supporting Surfaces; Principles of Construction of Low Altitude Flight Sensor Parameters; Sea Waves' Probability Characteristics in Space and Time; Sea Roughness Characteristics in Moving Frame; Characteristics of Errors of Low Altitude Flight Parameters Sensors; Synthesis of Integrated Systems for Measuring Motion Parameters; Examples of Integrated Meters Synthesis; Integrated Meters Investigation Under Instability Conditions of Operating and Possible Sensor Failures; Digital Realization of Integration Algorithms.
ISBN: 1-85312-831-7   2000
apx 250pp + video on CD-ROM
apx £185.00/US$297.00

Dynamics and Control of Structures in Space III

Editor: C.L. KIRK, Cranfield University, UK and *D.J. INMAN, Virginia Polytechnic Institute and State University, USA*

Containing the proceedings of the Third International Conference on the Dynamics and Control of Structures in Space, this book features sections on robotics and manipulators, dynamics and control of flexible structures, deployment dynamics, impact dynamics, microgravity, and multi-body dynamics.
ISBN: 1-85312-415-X   1996   696pp
£175.00/US$262.00

NWING for Windows
Complex Variable Boundary Element Method for Multi-Aerofoil Wing Design

T.W. CHIU, University of Exeter, UK

This user-friendly program uses two-dimensional inviscid boundary element method formulated with complex variables (CVBEM) for the design of multi-aerofoil aircraft and racing car wings. The results give valuable information on pressure distribution and lift/down force characteristics. The program also allows users to perceive the risk of flow separation at the leading edge and to select aerofoil profiles using NACA numbers.

The manual presents the mathematical theories of two-dimensional inviscid flow, the complex variable boundary element method, some new developments in the imposition of the Kutta conditions, and the treatment of more equations than unknown linear systems, along with details of the program. A number of examples relevant to both industrial users and engineering educators, and a discussion of applications in other fields are also included.

NWING v 1.0 for Windows runs under Windows 3.X, 95 and NT.
ISBN: 1-85312-514-8   1997
CD-ROM/Manual   £495.00/US$595.00

*An **NWING** demo can be downloaded from our Website at http://www.witpress.com or http://www.compmech.com. Alternatively, contact the Marketing Department at WIT Press to obtain a demonstration disk.*

Titles of Related Interest

**Marine & Offshore Engineering...p44**

NEW

The Revival of Dresden

Editors: W. JÄGER, Technical University of Dresden, Germany and *C.A. BREBBIA, Wessex Institute of Technology, UK*

In 1945 the ancient City of Dresden was destroyed by massive bombardments and much of its rich architectural heritage appeared to have been obliterated forever. Over the last half-century, however, Dresden has been lovingly reconstructed with the active collaboration of its citizens. This process, now culminating in the rebuilding of the Frauenkirche (the Church of Our Lady) is documented in this unique book.
Partial Contents: THE REVIVAL OF THE CITY: The Destruction of Dresden; Between Occupation Regime and Struggle for Survival - Economical and Social Situation in Dresden 1945; Condition, Responsibilities and Objectives of Urban Development in Dresden; The Contribution of Preservationists to the Reconstruction of the Semper Opera House; The Castle as a Ruin; Restoration of the Castle in Dresden; The Reconstruction of Taschenberg Palace; The Reconstruction of Villa Eschebach - An Example of Dialogue Between Historic and Contemporary Architecture; The Conservation of the Neustadt District as Part of the Cultural Cityscape; The Redevelopment of the Neumarkt; The Reconstruction of Cosel Palace. THE FRAUENKIRCHE: The Citizens' Initiative to Promote the Rebuilding of the Frauenkirche; The Utilisation of the Frauenkirche after Reconstruction; A Construction of Stone and Iron - Structural Concept for Reconstruction of the Dresden Frauenkirche; Structural Proof-Checking Using a Complete 3D FE-Model; George Bähr's Constructional Concept and the Reconstruction of the Cupola; The Reconstruction of the Sandstone Cupola; Investigations into the Structural Design of the Sandstone Surface Layer for the Dome Reconstruction; Investigations of Sandstones for the Reconstruction of the Frauenkirche.
Series: Advances in Architecture, Vol 7
ISBN: 1-85312-787-6   2000 272pp
£97.00/US$159.00
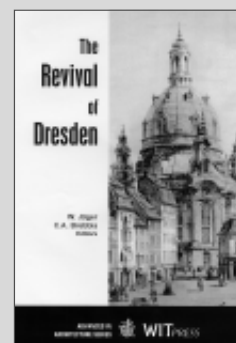
Advances in Architecture Series

BEST SELLER

The Conservation and Structural Restoration of Architectural Heritage
Theory and Practice
G. CROCI, *University of Rome 'La Sapienza', Italy*

"The book should be seen and known about by all engineers and architects who are developing their work in the field."
THE STRUCTURAL ENGINEER

"...the broad sweep of the book, and the depth of understanding and discussion, are immensely impressive."
SPAB NEWS (SOCIETY FOR THE PROTECTION OF ANCIENT BUILDINGS)

Structural analysis of architectural heritage is a new and growing branch of engineering. Knowledge of the history of architecture, material characteristics, instruments and techniques for investigations, diagnosis and restoration are all vital aspects for the correct understanding of structural behaviour and the ability to make correct decisions for repair and strengthening techniques. Designed for use by all professionals involved or interested in the preservation of monuments, the purpose of this book is to contribute to the development of new approaches in the area.

Many of the examples examined, including the Colosseum, the Tower of Pisa, the Pyramid of Chephren, the Tilla Kari Mosque in Samarkand, the temples of Angkor and Konarak, the Santa Maria Vieja Cathedral, the domes of St Peter, Hagia Sophia, the Pantheon, St Ignatio de Loyola and St Charles, are the result of projects and studies carried out during Giorgio Croci's distinguished career.

The book features numerous black and white photographs and illustrations by the author.

Contents: Preface. PART ONE - THE SCIENTIFIC APPROACH TO THE STUDY OF ARCHITECTURAL HERITAGE: The Role of Structure in the History of Architecture; The Decay of Materials and Structural Damage; Acquisition of Information and Data; Criteria and Techniques for Conservation and Restoration; Soil Settlement and Remedial Measures; Seismic Actions and Remedial Measures; Diagnosis and Safety Evaluation. PART TWO - STRUCTURAL ANALYSIS OF MASONRY BUILDINGS: Structural Analysis of Masonry Buildings - General Aspects; Structural Analysis of Masonry Buildings - Specific Calculations; References; Author's Report.
Series: Advances in Architecture, Vol 1
ISBN: 1-85312-482-6 1998 272pp £148.00/US$237.00

The author **Giorgio Croci** is Professor of Structural Engineering and holds the Chair of Structural Restoration of Monuments and Historic Buildings in the Faculty of Engineering at the University of Rome 'La Sapienza'. He is a consultant to UNESCO, ICCROM, the Council of Europe and the Italian Ministry of Foreign Affairs, and is President of the ICOMOS International Committee of Analysis and Restoration of Structures in Architectural Heritage.

NEW

Structural Design of Retractable Roof Structures
*Editor: **K. ISHII**, Yokohama National University, Japan*

Presenting state-of-the-art data, design guidelines and recommendations for retractable roof structures, this book is based on the findings of a working group established by the International Association of Shell and Spatial Structures (IASS). International in perspective, it contains discussion of two kinds of system: 1) Non-collapsible rigid frame type structures with rigid or flexible material stretched between frames and, 2) folding membrane types such as tents and pneumatics.

Contents: STATE-OF-THE-ART REPORT ON RETRACTABLE ROOF STRUCTURES: Outline of Retractable Roof Structures; Architectural Considerations; Considerations in Structural Design; Driving Mechanism; Retractable Membrane Roof Structures; List of Retractable Roofs. GUIDELINES FOR STRUCTURAL DESIGN OF RETRACTABLE ROOF STRUCTURES: General; Considerations in Architectural Planning; Structural Scheme; Loads and External Forces; Structural Materials and Safety Factors; Roof Structure, Supporting Structure and Base Structure; Driving Mechanism; Membrane Structures/Cable Structures; Maintenance, Management and Operation Plan. EXAMPLES OF RETRACTABLE ROOF STRUCTURES: Toronto Sky Dome (Canada); Gerry Weber Stadion (Germany); Pusan Dome (Korea); Amsterdam Arena (The Netherlands); Fukuoka Dome (Japan); Ocean Dome (Japan); Mukogawa Gakuin School Pool (Japan); Ariake Colosseum (Japan); Komatsu Dome (Japan); Ball Dome - Skill Training Center Gymnasium (Japan); Yokote Dome Theater (Japan).
Series: Advances in Architecture, Vol 5
**ISBN: 1-85312-619-5 2000 208pp £75.00/US$120.00**

Structural Studies, Repairs and Maintenance of Historical Buildings VI
*Editors: **C.A. BREBBIA**, Wessex Institute of Technology, UK and **W. JÄGER**, Technical University of Dresden, Germany*

This volume features contributions from the sixth international conference on this topic, held in Dresden. Containing state-of-the-art research and recent case studies, the book is divided into the following sections: Experimental Techniques; Monitoring and Testing; Mathematical Simulation and Computer Modelling; Deterioration, Protection and Evaluation of Materials; Seismic Behaviour and Repairs; Case Studies; Historical, Social and Architectural Aspects; Long Term Effects due to Environmental Causes; Techniques and Repairs; Maintenance and Restoration of Historical Buildings; Prevention of Structural Damage; Stabilisation, Underpinning and Reinforcement.
A special session examining the restoration of the city of Dresden, 85% of which was destroyed during World War II, is covered in a separate volume (see page 3).
Series: Advances in Architecture, Vol 6
ISBN: 1-85312-690-X 1999 928pp £290.00/US$455.00
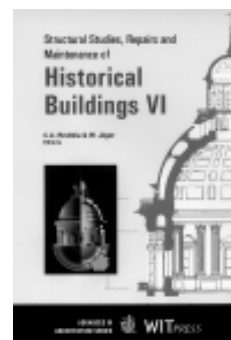
Advances in Architecture Series

Computational Acoustics in Architecture

NEW

*Editor: **J.J. SENDRA**, University of Sevilla, Spain*

Containing a significant amount of state-of-the-art knowledge on room acoustics, this book is written by authors or work teams, all of whom are internationally acknowledged researchers in this field.

The first two chapters centre on the most outstanding aspects of room acoustics studied in depth this century, namely absorption, sound reflection and diffusion, and echo and reverberation. Much current research is dedicated to perfecting models that analyse the so-called subjective attributes of sound fields, and the following sections present studies of simulation models of the binaural experience of listeners in a room. Finally, there are two examinations of recent work carried out on acoustics in concert halls and auditoria, and churches.

Series: Advances in Architecture, Vol 8
ISBN: 1-85312-557-1   2000   192pp
£87.00/US$140.00
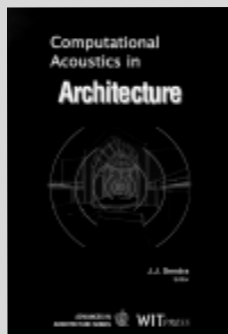
Historical Buildings of Iran
Their Architecture and Structure

***M.M. HEJAZI**, Queen Mary and Westfield College, University of London, UK*

The first authoritative work to investigate the historical buildings of Iran from the perspective of structural engineering.
Partial Contents: Ars sine scientia nihil: Knowledge in Persian Architecture; Construction Materials of Historical Structures; Architectural and Structural Features of Persian Historical Buildings; Arches; Vaults; Domes; Minarets; Water-works; Proposal for Future Research into Historical Structures.
Series: Advances in Architecture, Vol 2
ISBN: 1-85312-484-2   1997   168pp
£67.00/US$99.00

Earth Construction Handbook

NEW

***G. MINKE**, Director of the Building Research Institute, Kassel University, Germany*

Which building material
• Absorbs and desorbs humidity faster, and to a higher extent, than any other?
• Produces hardly any environmental pollution?
• Balances indoor climate and moisture thus creating an extremely healthy environment?
The answer is EARTH. In nearly all hot-dry and moderate climates of the world earth has been the predominant building material. Earth construction techniques have been known for more than nine thousand years and, even today, one-third of mankind lives in earth houses.
The **Earth Construction Handbook** provides a survey of applications and construction techniques, including physical data, and explains the material's specific qualities together with the possibilities of optimising these. The information given can be practically applied by engineers, architects, builders, planners, craftsmen and laymen who wish to construct cost-effective buildings which provide a healthy, balanced indoor climate.
Contents: Properties of Earth as a Building Material; Preparation of Loam; Improving Earth's Characteristics by Special Treatment or Additives; Rammed Earth Work; Earthblock Work; Large Blocks and Prefabricated Panels; Direct Forming with Wet Loam; Wet Loam Infill in Skeleton Structures; Tamped, Poured or Pumped Lightweight Loam; Loam Plasters; Weather Protection of Loam Surfaces; Repair of Loam Components; Designs of Particular Building Elements; Examples of Modern Earth Architecture; Future Prospects.
Series: Advances in Architecture
ISBN: 1-85312-805-8   2000
b/w diagrams & photographs   apx 200pp
apx £38.00/US$63.00

Towers and Domes

***F. ESCRIG**, University of Sevilla, Spain*

Detailing the evolution of towers and domes from a structural viewpoint, this highly illustrated book is written as two essays running parallel, one textual, the other graphic, rather than as a detailed study on technical or mathematical concepts.
Contents: The Architecture for Survival; The Great Architecture of Nature; Piled Stones; Arguments of Authority; Inventing Architecture Again; Petrified Woods; Against Vegetal Architecture; Dreams of Reason; Domesticated Nature.
Series: Advances in Architecture, Vol 4
ISBN: 1-85312-437-0   1998   120pp
£59.00/US$95.00

Structural Studies, Repairs and Maintenance of Historical Buildings

*Editors: **S. SÁNCHEZ-BEITIA**, University of the Basque Country, Spain and **C.A. BREBBIA**, Wessex Institute of Technology, UK*

This book comprises the papers presented at the Fifth International Conference on Structural Studies, Repairs and Maintenance of Historical Buildings. The following wide variety of topics are covered: History and Architecture; Monitoring and Testing; Computer Simulation; Deterioration and Protection of Materials; Material Evaluation and Restoration; Retrofitting; Different Types of Structures; Domes; Masonry; Seismic Behaviour and Vibrations; Repairs and Strengthening; Case Studies; and Heritage as a Factor of Development.
Series: Advances in Architecture, Vol 3
ISBN: 1-85312-466-4   1997   696pp
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Save over 10% when you buy both volumes together.

Structural Studies of Historical Buildings IV
Volume 1 - Architectural Studies, Materials and Analysis
Volume 2 - Dynamics, Repairs and Restoration

*Editors: **C.A. BREBBIA**, Wessex Institute of Technology, UK and **B. LEFTHERIS**, Technical University of Crete, Greece*

The proceedings of the Fourth International Conference on Structural Studies, Repairs and Maintenance of Historical Buildings.
Volume 1 - ISBN: 1-85312-425-7;
1-56252-343-0 (US, Canada, Mexico)   1995
464pp   £128.00/US$196.00
Volume 2 - ISBN: 1-85312-426-5;
1-56252-344-9 (US, Canada, Mexico)   1995
384pp   £106.00/US$163.00
SET ISBN: 1-85312-314-5; 1-56252-238-8
(US, Canada, Mexico)   1995   848pp
£210.00/US$322.00 *(Over 10% saving)*

Titles of Related Interest

Earthquake Engineering and Soil Dynamics Section...p17

Structural Engineering Section...p49

Local History

NEW

Winchester Through the Ages

P. KILBY, Conservation Architect for the City of Southampton, UK

Following his highly successful book **Southampton Through The Ages** Peter Kilby now moves on to discuss the social and architectural heritage of England's one-time capital from its earliest beginnings to the present day.

His primary sources are the buildings themselves, both historic and new, and unlike other books on the subject which are presented in strictly chronological order, this title takes a fresh approach by describing the city on an area by area basis. An up-to-date picture of Winchester's architecture, cityscape and landscape set against the influences of its long history, this new publication includes numerous prints and photographs.

Partial Provisional Contents: The Close; Wolvesey Castle and the Bishop's Palace; Winchester Castle; Winchester College; St Cross Hospital; Street Patterns and Archaeological Excavations; Open Spaces; City Museums; City Churches; The Hospital and Prison; 20th Century Winchester.
Series: Towns and Cities Through the Ages, Vol 2
ISBN: 1-85312-584-9   2000   apx 200pp apx £29.00/US$45.00

Southampton Through the Ages

P. KILBY, Conservation Architect for the City of Southampton, UK

"…a very interesting and well researched book… easy to read and informative."
RIBA NEWS

An enlightening account of Southampton's social and architectural history from its inception in AD43 until the present day, this book contains over 100 illustrations and photographs many of which are being published for the first time. Providing information so far unrivalled by other leading books on Southampton, this innovative title will be of interest to the general public, as well as to amateur and professional historians.
Partial Contents: The Medieval Walled Town and Town Quays; The 'Golden Age' of the Spa and Resort Periods; Southampton Docks – The Old and the New; The London and South Western Railway and the Ill-Fated Canal; The Victorian Era; The Inter-War Years; World War II; Modern Southampton.
Series: Towns and Cities Through the Ages, Vol 1
ISBN: 1-85312-392-7; 1-56252-316-3 (US, Canada, Mexico)   1997   210pp £25.00/US$38.00

Applications of Artificial Intelligence in Engineering XIII

*Editors: **G. RZEVSKI**, Brunel University, UK, **R.A. ADEY**, Wessex Institute of Technology, UK and **P. NOLAN**, National University of Ireland, Galway*

This book and CD-ROM contain the papers with extended abstracts presented at the Thirteenth International Conference on the Applications of Artificial Intelligence in Engineering (AIEng). The AIEng conferences have consistently provided an important forum for the discussion of realistic AI applications. They have tracked the maturing of AI from its early days of tremendous but hyped promise, through a period of retrenchment when some unrealistic expectations were unfulfilled, to the present when many of AI's underlying technologies are firmly established within engineering.

The papers in this latest volume represent the work of AI researchers from around the world and cover all the main branches of engineering including civil and environmental engineering, hydrology, architecture, manufacturing and process engineering, and control engineering. Amongst the techniques reviewed are neural networks, fuzzy logic, genetic algorithms, machine learning, distributed intelligence and rule-based systems. Design, AI tools and fault diagnosis are also discussed.
Series: Software Studies, Vol 1
ISBN: 1-85312-596-2   1998 200pp + CD-ROM   £195.00/US$312.00

Knowledge Processing for Structural Design

B. KUMAR, University of Strathclyde, Glasgow, UK

This book describes the implementation of artificial intelligence techniques, such as non-monotonic reasoning and knowledge-based techniques, in structural design. The author presents a conceptual model for integrated structural design and provides a practical study of some state-of-the-art tools and techniques.
Series: Topics in Engineering, Vol 25
ISBN: 1-85312-376-5; 1-56252-300-7 (US, Canada, Mexico)   1995   200pp £69.00/US$106.00

Applications of Artificial Intelligence in Engineering XII

*Editors: **R.A. ADEY**, Wessex Institute of Technology, UK, **G. RZEVSKI**, Brunel University, UK and **R. TETI**, University of Naples, Italy*

Focusing on the applications of AI in engineering as well as the tools and techniques required for its successful use, this book and CD-ROM set features the proceedings of the Twelfth International AIEng Conference.
Partial Contents: Knowledge Representation; Neural Networks; Genetic Algorithms; Integration of Design and Manufacturing; Construction and Power Industry; Control, Simulation and Diagnostics; Research and Education.
ISBN: 1-85312-471-0   1997 184pp + CD-ROM   £190.00/US$299.00

Applications of Artificial Intelligence in Engineering XI

*Editors: **R.A. ADEY**, Wessex Institute of Technology, UK, **G. RZEVSKI**, Brunel University, UK and **A.K. SUNOL**, University of South Florida, USA*

The proceedings of the Eleventh International Conference on Applications of Artificial Intelligence in Engineering.
Partial Contents: Knowledge Based Design; Neural Network Applications; Genetic Algorithms and Artificial Life; Constraint Propagation; Fault Diagnosis; Multimedia and Man/Machine Communication.
ISBN: 1-85312-410-9   1996 135pp + CD-ROM   £199.00/US$299.00

Machine Learning of Design Concepts

HENG LI, James Cook University, Australia

Describes recent machine learning research and relevant applications in engineering design domains.
Series: Topics in Engineering, Vol 23
ISBN: 1-85312-358-7; 1-56252-281-7 (US, Canada, Mexico)   1995   180pp £59.00/US$91.00

Titles of Related Interest

Computing and Software Section...p14

Structural Engineering Section...p49

NEW

Medical Applications of Computer Modelling and Fluid Dynamics

Volume 1 - Cardiovascular and Ocular Systems

Volume 2 - Respiratory System

Editor: **T.B. MARTONEN**, *US Environmental Protection Agency, USA*

Designed for use in both academic and research environments, these two volumes address applications of computer modelling and fluid dynamics to biological systems. Emphasis is placed on demonstrating the important roles that mathemtical theory and computer technology can play in the medical arena, and general scientific concepts are integrated with specific technical issues throughout.

Volume 1 - Contents: Fundamentals of Fluid Dynamics; Modelling of Coronary Vascular Trees - Generating Optimized Structures; Optimized Models of Coronary Vascular Trees - Applications in Cardiology and Surgery; Computer Simulation of Dilute Suspension Flows in Branching Blood Vessels; Computer Aided Design and Optimal Surgical Reconstruction of the Carotid Artery Bifurcation; Morphology of the Human Eye - Glaucoma Physiology and Laser Iridectomy; Computer Modelling of Ocular Fluid Dynamics and Thermodynamics; Simulating and Optimizing the Pre-Removal Step of Laser Iridectomy.

Volume 2 - Contents: Morphology of the Human Extrathoracic Airways; Computational Fluid Dynamics of the Extrathoracic Airways; Computer Modelling of Fluid Dynamics and Particle Motion in the Larynx and Trachea; The Morphology of the Lung; Fluid Dynamics and Related Particle Deposition Patterns in Human Airway Bifurcations; Stochastic Modelling of Particle Deposition in the Human Lung; Computational Fluid Dynamics in the Human Lungs I - Effects of Natural Airway Features; Computational Fluid Dynamics in the Human Lungs II - Effects of Airway Disease; Design of Aerosol Systems for Drug Delivery to the Lungs using Numerical Methods; Pharmacokinetic and Pharmacodynamic Aspects of Inhaled Therapeutic Agents; Computer Methods for the Assessment of the Fate of Inhaled Aerosol using Data from Multimodality Imaging; Clinical Application SPECT IMAGING.
Series: Advances in Computational Bioengineering
Volume 1 - ISBN: 1-85312-613-6   2000 apx 300pp   apx £89.00/US$139.00
Volume 2 - ISBN: 1-85312-808-2   2000 apx 330pp   apx £98.00/US$157.00
SET ISBN: 1-85312-809-0   2000 apx £168.00/US$266.00 *(10% saving)*

NEW

Computational Inverse Problems in Electrocardiography

Editor: **P.R. JOHNSTON**, *University of Tasmania, Australia*

Collecting together details of techniques and results previously scattered throughout a wide range of journals, this book provides a unique survey of up-to-date methods designed to solve the inverse problem of electrocardiography. The various chapters included survey numerical methods, theoretical analysis, and numerical, experimental and clinical validations for this problem.
Computational Inverse Problems in Electrocardiography is primarily intended for researchers and graduate students in biomedical engineering, and for clinicians who are interested in applying these techniques in their work.
Series: Advances in Computational Bioengineering
ISBN: 1-85312-614-4   2000   apx 330pp apx £99.00/US$159.00

Nanoscale Fluid Dynamics in Physiological Processes
A Review Study

M. CIOFALO, *University of Palermo, Italy,* **M.W. COLLINS**, *South Bank University, London, UK and* **T.R. HENNESSY**, *City University, London, UK*

This is the first book to treat nanoscale fluid dynamics and transport problems in physiological flows as a complete subject, although the different problems featured have been studied independently for several years. Intended as a review, rather than a detailed description of the theories involved, it provides a general introduction to each area together with appropriate references.
The following topics are covered: Nanotechnology; The Ultrastructural and Functional Basis of Nanoscale Transport Phenomena in Physiology; Capillary Permeability and Trans-Capillary Transport; Transport of Macromolecules Across the Arterial Wall and its Relevance to Atherogenesis, and Other Issues in Blood-Wall Interaction; Filtration in the Kidney Glomerulus; Nanoscale-Dependent Rheology of Articular Cartilage and Other Soft Hydrated Tissues; Transport Phenomena in the Cell; Microhydrodynamics Phenomena in the Circulation; Computational Methods for Nanoscale Fluid Flow Problems. Over 2,000 references, mostly from the last twenty years, are included.
Series: Advances in Computational Bioengineering, Vol 2
ISBN: 1-85312-586-5   1999   360pp £96.00/US$149.00

Haemodynamics of Arterial Organs
Comparisons of Computational Predictions with *In Vitro* and *In Vivo* Data

Editors: **X.Y. XU**, *Imperial College, London, UK and* **M.W. COLLINS**, *South Bank University, London, UK*

This book emphasises the importance of validating numerical predictions using *in vitro* and/or *in vivo* measurement data.
- Contains contributions from internationally acknowledged experts in the field.
- Reflects new developments in numerical simulation and experimental techniques for the study of haemodynamics in various arterial organs.
- Highlights comparisons of predictions with laboratory and/or clinical data acquired by means of the most advanced experimental and clinical measurement techniques.

Contents: Haemodynamics of the Reconstruction of Complex Cardiac Malformations; Mathematical Modelling of Flow Effects and Transport Processes in Arterial Bifurcation Models; Simulation of Time-Dependent Blood Flow Past Valve Prostheses; Comparisons between Computational Haemodynamics, Photochromic Dye Flow Visualisation and Magnetic Resonance Velocimetry; Simulation of Flow in Human Arterial Bifurcations using a Combination of CFD and MRI Techniques; Flow Visualisation of Cardiovascular Models using the Dynamic Flow Birefringence Method.
Series: Advances in Computational Bioengineering, Vol 1
ISBN: 1-85312-509-1   1999   288pp £85.00/US$136.00
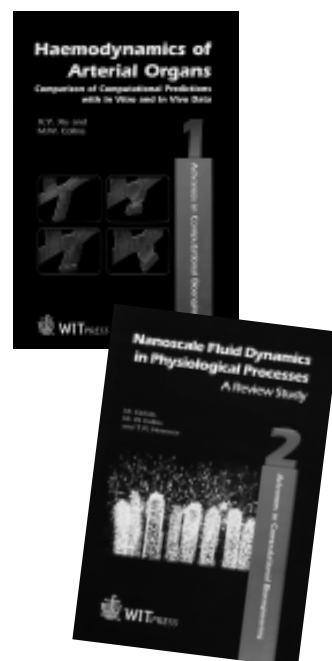
NEW

Announcing a major new international series...
Design in Nature

Our modern world is largely based on a still growing revolution of scientific knowledge. The engineering designers of spacecraft and bridges, for example, have at their disposal a vast array of relationships or laws for materials, mechanisms and control, which have been assembled quite independently of the biological world. However, as space exploration accustoms us to cosmic scales, and medical and surgical developments to the molecular scale of genetics, we are increasingly being brought back to the world of nature.

The rationale for the Series is straightforward. It rests upon the universality of scientific laws in both nature and human construction, and on the common chemical foundation of their materials. Our organic and inorganic worlds have common energy requirements, while there is an identity, still under debate, between the 'entropy' of the Second Law of Thermodynamics and 'information content', which is of great theoretical significance in interpreting evolution.

Individual books within the Series will provide in depth coverage of such topics as mathematics in nature, evolution, natural selection, vision and acoustic systems, robotics, shape in nature, biomimetics, and creativity. The material will be presented in a way which, while rigorous in approach, will be accessible to specialists and non-specialists alike.

NEW

The World of Science and Nature
Volume 1 - The Laws of Design
Volume 2 - The Information Revolution
Editors: **M.W. COLLINS**, _South Bank University, London, UK,_ **J.A. BRYANT**, _University of Exeter, UK and_ **M.A. ATHERTON**, _South Bank University, London, UK_

Highlighted with individual contributions from eminent specialists, these multiauthored volumes combine authority, inspiration and state-of-the-art knowledge. Both informative and inspiring they are designed to appeal to scientists and interested laypeople alike.
Volume 1 provides a comprehensive study of the fundamental laws of science and design and includes coverage of such topics as mathematics in nature, and evolution and the laws of thermodynamics. Engineering design specialists explain the meanings of 'design' and 'creativity' and synthesise the concepts of natural selection, genetic algorithms and other design procedures. There are also authoritative biological studies of design in plants and human vision systems.
While concentrating on the engineering design viewpoint, the volume incorporates editorial material which gives a consistent biological context.
Volume 2 complements and extends the scope of the first, with the biological viewpoint being stressed. Following an introductory chapter on design as understood in biology, the various aspects of the biological information revolution are addressed. Areas discussed include molecular structure, the genome, development, and neural networks. A section on information theory provides a link with engineering, and the scope is also broadened to include the implications of motion in nature and engineering.
Series: Design in Nature, Vols 1 & 2
Volume 1 - ISBN: 1-85312-852-X 2000 apx 500pp apx £149.00/US$239.00
Volume 2 - ISBN: 1-85312-853-8 2000 apx 500pp apx £149.00/US$239.00

Simulations in Biomedicine IV
Editors: **H. POWER** and **C.A. BREBBIA**, _Wessex Institute of Technology, UK and_ **J. KENNY**, _University of Perugia, Italy_

The proceedings of the Fourth International Conference on Computers in Biomedicine. Papers are divided under the following headings: Simulation of Physiological Processes; Computational Fluid Dynamics in Biomedicine; Orthopaedics and Bone Mechanics; Data Acquisition and Analysis; Imaging Processing; Design and Simulation of Artificial Organs and Non-Conventional Therapy.
**ISBN: 1-85312-462-1 1997 392pp £129.00/US$199.00**

Simulation Modelling in Bioengineering
Editors: **M. CERROLAZA**, _Central University of Venezuela, Venezuela,_ **D. JUGO**, _University of Los Andes, Venezuela and_ **C.A. BREBBIA**, _Wessex Institute of Technology, UK_

This book features the proceedings of the First International Conference on Simulation Modelling in Bioengineering. The papers are divided into the following sections: Simulations of Physiological Processes; Biofluid Mechanics; Orthopaedics/Bone Mechanics; Imaging Processing; Data Acquisition and Analysis; Electrical and Magnetic Simulation.
ISBN: 1-85312-455-9 1996 328pp £95.00/US$147.00

Simulation Modelling in Bioengineering
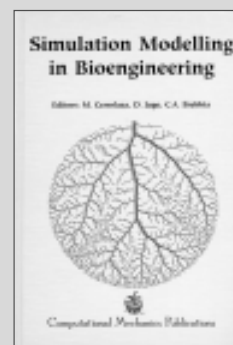
Titles of Related Interest

Advances in Fluid Mechanics Series...p29

Electromagnetic Imaging in Science and Medicine: With Wavelet Applications...p19

Intra and Extracorporeal Cardiovascular Fluid Dynamics – Volumes 1 & 2...p31

Coupled Field Problems

Editors: **A.J. KASSAB**, *University of Central Florida, USA and* **M.H. ALIABADI**, *Queen Mary College, University of London, UK*

A collection of chapters contributed by researchers involved in multidisciplinary analysis of coupled fields. Problems in which heat transfer within a solid is coupled to fluid flow and heat transfer external to the solid are addressed together with interaction with other modes of heat transfer such as radiation.

- Considers multidisciplinary analysis and optimization in the context of turbomachinery blade design, metal cutting and laser machining, as well as modeling of glass forms.
- Discusses dual reciprocity formulations for convective-diffusive solid-liquid phase change problems associated with metal foundry processes.
- Reviews recent developments in poro-elasticity and thermo-elasticity.

Partial Contents: Aero-Thermo-Elastic Concurrent Design Optimization of Internally Cooled Blades; Boundary Element Method - Sensitivity Analysis and Conjugate Problems; Interactions of Radiation Heat Transfer with Other Modes; Coupled BEM/FVM Algorithm for Conjugate Heat Transfer; Using BEM in Glass Modeling; Recent Developments in Poro-elasticity.
Series: Advances in Boundary Elements
ISBN: 1-85312-554-7   2000   apx 300pp apx £95.00/US$158.00

Boundary Element Technology XIII

Editors: **C.S. CHEN**, *University of Nevada, Las Vegas, USA,* **C.A. BREBBIA**, *Wessex Institute of Technology, UK and* **D.W. PEPPER**, *University of Nevada, Las Vegas, USA*

Featuring the proceedings of the Thirteenth International Conference on Boundary Element Technology (BETECH), this volume contains a large number of contributions from mathematicians. However, some which do not deal directly with BEMs are also included in an effort to open up new directions of research. The papers are divided under the following headings: Fluid Flow; Heat Transfer; Shape Optimization; Stress Analysis; Vibrations and Dynamics; Electrostatics and Electromagnetics; Industrial Applications; Radial Basis Functions; Special Methods; and Computational Aspects. The book also includes presentations from the Second Seminar on Computational Methods and Testing for Engineering Integrity, held concurrently with BETECH.
Series: Boundary Elements, Vol 2
ISBN: 1-85312-688-8   1999   720pp £215.00/US$344.00

The Trefftz Finite and Boundary Element Method

Q.-H. QIN, *University of Sydney, Australia*

An accessible and up-to-date introduction to the Trefftz finite element method. The author's main emphasis is on fundamental concepts and the development of different Trefftz element formulations for stress analysis of various elastic problems. The book provides an easy-to-follow reference for postgraduate students, researchers, scientists and professional engineers in computational mechanics, structural design, and applied mathematics and in the inter-disciplinary fields of mechanical, electrical, civil, structural and aeronautical engineering.
Partial Contents: The Basic Concept of T-Elements; Modified Variational Principles; Comparison of T-Elements with Conventional Elements; Trefftz Functions; Element Matrix Equations; Special-Purpose Functions for Local Defects; P-Version Elements; Sensitivity to Mesh Distortion; T-Elements for Thick Plates; T-Elements for Nonlinear Problems.
Series: Advances in Boundary Element Methods
ISBN: 1-85312-855-4   2000   apx 272pp apx £78.00/US$128.00

Singular Integrals in Boundary Element Methods

Editors: **V. SLADEK** *and* **J. SLADEK**, *Slovak Academy of Sciences, Slovak Republic*

Describing techniques which are universal in character and can be applied to many different engineering problems, this book provides a theoretical and numerical treatment for singular integrals in Boundary Element Methods (BEMs). Both the boundary and domain integrals are considered in two- and three-dimensional boundary value problems, while the use of symbolic computation and the formulation using complex arithmetic in the case of plane problems are outlined. The formulations given deal with the potential problems, elasticity, plate and crack problems.
Partial Contents: Evaluation of Singular and Hypersingular Galerkin Integrals – Direct Limits and Symbolic Computation; Singular Integrals and Their Treatment in Crack Problems; Regularization and Evaluation of Singular Domain Integrals in Boundary Element Methods; Some Computational Aspects Associated with Singular Kernels.
Series: Advances in Boundary Elements, Vol 3
**ISBN: 1-85312-533-4   1998   448pp £125.00/US$195.00**

Boundary Elements XXII

Editors: **C.A. BREBBIA** *and* **H. POWER**, *Wessex Institute of Technology, UK*

Covering state-of-the-art developments in this exciting field of engineering analysis, this volume consists of the papers presented at the latest in the highly successful series of international conferences devoted to the Boundary Element Method . The contributions, some of which are invited, come from leading experts and established practitioners in the BE field, and focus on major advances made in formulation and application.
In addition to the usual topics covered **Boundary Elements XXII** addresses areas of active research related to the BEM community, such as meshless techniques, advanced formulations and high performance computing. Further work in the dual reciprocity method is also discussed. Other papers reflect recent advances in fluid dynamics, fracture and damage mechanics, acoustics and electromagnetism, while there is also a section on the industrial implementation of the technique, and the way in which it can be used as a design tool.
Series: Advances in Boundary Elements
ISBN: 1-85312-824-4   2000   apx 700pp apx £210.00/US$338.00
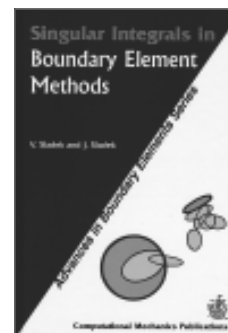
Boundary Element Research in Europe

Editor: **C.A. BREBBIA,** *Wessex Institute of Technology, UK*

This book contains edited versions of the papers presented at the Second European Boundary Element Symposium (EUROBEM).
The topics featured are as follows: Stress Analysis Applications; Fluid Flow; Acoustics; Nonlinear Material Problems; Electrical Problems; Electromagnetics; Vibrations and Dynamics; Thermal Problems; Mathematical and Computational Aspects; Plates.
Series: Boundary Elements, Vol 1
ISBN: 1-85312-594-6   1998   344pp £95.00/US$157.00

NEW

Underlying Principles of the Boundary Element Method

D. CARTWRIGHT, *Bucknell University, USA*

This text is designed for undergraduates, teachers and industrial personnel who need an accessible introduction to the underlying ideas of the Boundary Element Method. Detailed derivations are provided and where more complex mathematics is used it is explained in the context of the method. In addition the author employs examples and physical interpretations which will appeal to students new to the method. Consistent notation is used throughout and the various topics are developed in an analogous manner to aid understanding.

- Employs a physical approach based on the idea of Green's Functions.
- Uses simple one-dimensional fields to explain vital concepts.
- Emphasises the basis of the method and not its numerical implementation.
- Includes worked examples and problems for solution.

ISBN: 1-85312-839-2   2000   apx 300pp apx £89.00/US$135.00

Lecturers - Price reductions are available when you purchase multiple copies of this text. Please contact the Marketing Department at WIT Press for details.

Plate Bending Analysis with Boundary Elements

Editor: M.H. ALIABADI, *Wessex Institute of Technology, UK*

Thin-walled plate structures are widely used in engineering practice for the design of aircraft, spacecraft and ground structures. Studying their behaviour when subjected to different loadings is essential. This book presents a boundary element formulation for linear and nonlinear problems in plate bending, providing a detailed formulation and implementation for analysis.
Contents: The BEM for Reissner Plates Resting on Elastic Foundations; Boundary Element Analysis of Thick Reissner Plates in Bending; Elastoplastic Analysis of Reissner's Plates using the BEM; Nonlinear Material Analysis of Reissner's Plates; Stress Resultant Based Integral Equation Formulation for Plate Bending Analysis; Fracture Analysis of Plate Bending Problems using the BEM; Adaptive Boundary Element Formulations for Plate Bending Analysis; Nonlinear Analysis of Plate Bending by BEM; Analysis of Plates with Variable Thickness - An Analog Equation Solution; Stability.
Series: Advances in Boundary Elements, Vol 2
ISBN: 1-85312-531-8   1998   368pp £94.00/US$148.00

Boundary Integral Methods
Numerical and Mathematical Aspects

Editor: M.A. GOLBERG, *Las Vegas, Nevada, USA*

Presenting some of the most significant new mathematical and computational developments in the Boundary Element Method (BEM), this book covers a wide variety of research including:-

- Recent work using the Laplace transform and the dual reciprocity method (DRM) to solve both linear and nonlinear reaction-diffusion equations.
- A novel approach to solving partial differential equations with nonconstant coefficients.
- A new 'direct-mixed' BEM for solving hypersingular integral equations in acoustics.
- How to use group theory in BEM algorithms to exploit the symmetries inherent in many boundary integral equations to substantially reduce system sizes.

Series: Computational Engineering, Vol 1
ISBN: 1-85312-529-6   1998   392pp £112.00/US$179.00

Boundary Elements XXI

Editors: C.A. BREBBIA and H. POWER, *Wessex Institute of Technology, UK*

This book contains a selection of papers presented at the 21st International Conference on the Boundary Element Method.
The 70 papers featured have been contributed by researchers from many countries and are divided under the following headings: Fracture Mechanics and Fatigue; Inelastic Problems; Thermal Problems; Electromagnetics; Numerical Computational Techniques; Inverse Problems; Fluid Dynamics; Acoustics; Dual Reciprocity Method; Soil and Soil Structure Problems; Fluid Flow; Mathematical Aspects and Advanced Formulations; Shape Sensitivity and Optimization.
Series: Advances in Boundary Elements, Vol 6
ISBN: 1-85312-698-5   1999   808pp £210.00/US$344.00
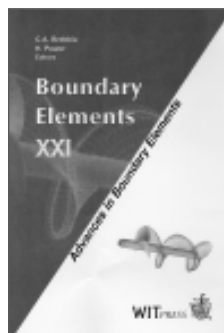
Boundary Element Formulations for Thick Plates

Y.F. RASHED, *Cairo University, Egypt*

Plate bending problems have many applications in civil and mechanical engineering. The analysis of plates using the Boundary Element Method (BEM), however, has received little attention in existing research and literature. This book presents new Boundary Element formulations for plate bending problems in which the Reissner plate bending theory is used to model the bending behaviour of the plate. The author applies several integral equations to solve engineering problems relating to a building slab, beam, footing, and simple raft and the results are compared against analytical solutions such as a finite difference method, a finite element method and a three-dimensional Boundary Element Method. These confirm that the Boundary Element formulations presented are a competitive alternative to existing numerical methods.
Contents: Introduction; Theory of Plates; The Boundary Element Method; Hypersingular Integral Equation Formulation; Integral Equation Formulation and Fundamental Solution for Foundation Plates; Transformation of Domain Integrals to the Boundary for Foundation Plates; The Boundary Element Method for Foundation Plates; Applications in Structural Analysis; Bibliography; Appendices.
Series: Topics in Engineering, Vol 35
ISBN: 1-85312-628-4   1999   176pp £79.00/US$124.00

Boundary Elements XX

Editors: A.J. KASSAB, *University of Central Florida, USA*, *C.A. BREBBIA*, *Wessex Institute of Technology, UK* and *M. CHOPRA*, *University of Central Florida, USA*

Features the papers presented at the Twentieth World Conference on the Boundary Element Method. A joint meeting of the largely theoretical BEM (Boundary Element Method) series and the more practically oriented BETECH (Boundary Element Technology) series, the Conference blended both of these aspects together to push back the frontiers of BEM still further.
Topics covered include fracture mechanics and fatigue, inelastic problems, contact mechanics, electromagnetics, fluid dynamics and aerodynamics, acoustics, corrosion, elastodynamics and thermal problems. Recent advances in general computational techniques of BEM, development of fundamental solutions and the application of inverse problems are also reviewed.
Series: Advances in Boundary Elements, Vol 4
ISBN: 1-85312-592-X   1998   736pp £220.00/US$349.00

Discontinuous Materials and Structures

Editor: **M.B. BUSH**, *The University of Western Australia, Australia*

Research into the Boundary Element Method in all its various forms has reached a high level of maturity and it is now well established as part of the computational tool box.

The contributors to this volume focus on a class of problems where the BEM can be exploited to full effect. These involve global variations in material behaviour, where the material properties vary throughout the domain in a piecewise constant fashion, or where the variation may be adequately represented by an anisotropic elastic medium approximation.

Contents: Exploitation of the Repeat Cell Concept for the Modelling of Elasto-Plastic Properties of Metal-Matrix Composites; A New BEM for Two-Dimensional Anisotropic Elastic Solids Containing Multiple Holes, Cracks and Inclusions; Boundary Element Methods for Torsion of Composite Shafts; Mechanics of Fibre Suspensions; Fracture Mechanics Analysis of Homogeneous Anisotropic Laminates; Boundary Element Analysis of Discontinuous Rock Masses; A Hybrid BE/FE Method for the Analysis of Laminated Structures.
Series: Advances in Boundary Elements, Vol 5
ISBN: 1-85312-534-2   1998   280pp
£95.00/US$155.00
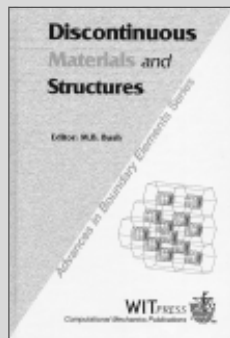
Boundary Elements XIX

Editors: **M. MARCHETTI**, *Universita 'La Sapienza', Italy,* **C.A. BREBBIA** *and* **M.H. ALIABADI**, *Wessex Institute of Technology, UK*

This book features the proceedings of the Nineteenth International Conference on the Boundary Element Method. The contents are divided under the following headings: Elastodynamics; Material Processing and Metal Forming; Fundamental Principles; Industrial Applications; Heat Transfer; Viscous Flow; Non-Newtonian Flow.
ISBN: 1-85312-472-9   1997   856pp
£225.00/US$345.00

Boundary Element Methods for Damage Tolerance Design of Aircraft Structures

N. SALGADO, *Embraer S. A., Brazil*

"...clearly written and concerned with a very important technical problem....The book is very useful in promoting further research leading to integrated systems of analysis and design of stiffened panels."
APPLIED MECHANICS REVIEWS

Interactive computer programs for damage tolerance design represent a step towards higher productivity and quality in this field. This book investigates the viability of such systems. An object-oriented interactive system that supports an extensive range of tasks including automatic mesh design is developed for the design of stiffened panels.
Partial Contents: Damage Tolerance Assessment; Boundary Element Method; Analysis of Stiffened Panels; A Design System of Stiffened Panels; Analysis of Mechanically Attached Repairs and Lap Joints; Analysis of Adhesively Bonded Patches.
Series: Topics in Engineering, Vol 33
ISBN: 1-85312-532-6   1998   192pp
£69.00/US$110.00

Boundary Integral Formulations for Inverse Analysis

Editors: **D.B. INGHAM**, *University of Leeds, UK and* **L.C. WROBEL**, *Brunel University, UK*

Presents boundary integral formulations for the analysis of inverse problems in several fields of engineering. Each self-contained chapter is written by well-known experts and examines state-of-the-art developments.
Contents: Identification of Thermal Properties of Heat Conducting Materials; Solution of the Inverse Geometric Problem for the Detection of Subsurface Cavities by the IR-CAT Method; Integral Equation Methods in Inverse Acoustic and Electromagnetic Scattering; Boundary Element Formulations for Sensitivity Analysis and Crack Identification; The Interpretation of Sizing Instruments Data - Aerosol Particle Size Distribution by Diffusion Batteries; Boundary Element Analysis of Inverse Problems in Corrosion Engineering; Parameter Identification in Groundwater Systems; BIE-Based Shape Sensitivity Analysis and Applications; The Identification of Piecewise Homogeneous Properties of Rocks; BEM Approach to Inverse Thermal Problems; Inverse Analysis of Continuous Fields using the BEM with a Filtering Procedure; Free Surface Flows.
Series: Advances in Boundary Elements, Vol 1
ISBN: 1-85312-474-5   1997   368pp
£98.00/US$157.00

A Green's Function Time-Domain BEM of Elastodynamics

C. RICHTER, *University of Bochum, Germany*

"...an exhaustive presentation… [It] should be very useful for BEM practitioners, preferably those with some previous background in elastodynamic integral formulations. On the other hand, any researcher or student of elastodynamics would be able to use this work to gain an understanding of the general computational setting of the BEM and its implementation using the recently derived formulas for the half-space Green's functions."
APPLIED MECHANICS REVIEWS

Demonstrates how the transient Green's Function of the elastodynamic 2-D Lamb's problem is derived and used to develop a fast and accurate time-domain BEM. The Green's Function is purely algebraic without any integrals and is presented in numerically applicable form for the first time.
Partial Contents: Boundary Element Method; Time-Domain BEM; Cagniard-de-Hoop Method; Elastodynamics; Wave Propagation; Green's Function.
Series: Topics in Engineering, Vol 31
ISBN: 1-85312-494-X   1997
Book on CD-ROM   £59.00/US$94.00
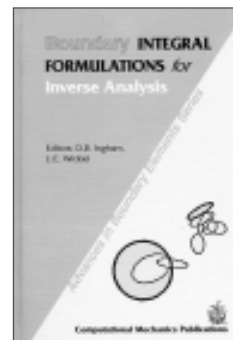
Boundary Element Technology XII

Editors: **J.I. FRANKEL**, *University of Tennessee, USA,* **C.A. BREBBIA** *and* **M.H. ALIABADI**, *Wessex Institute of Technology, UK*

This book contains the proceedings of the Twelfth International Conference on Boundary Element Technology.
Partial Contents: Fracture Mechanics; Stress Analysis; Sensitivity Analysis and Inverse Problems; Acoustics; Aerodynamics; Electrical and Electromagnetic Problems; Heat Transfer and Fluid Flow; Mathematical Aspects and Classical Formulations; Industrial Applications.
ISBN: 1-85312-460-5   1997   504pp
£148.00/US$237.00

NEW

Boundary Element Starter Pack

For Fracture Mechanics and Crack Growth, Stress Analysis, and Acoustics

Compilers: R.A. ADEY, S.M. NIKU, J. BAYNHAM and A. NEVES, Wessex Institute of Technology, UK

A unique introduction to boundary element analysis in the specific fields of fracture mechanics and crack growth, stress analysis, and acoustics, where the Boundary Element Method is, in many cases, the pre-eminent analytical technique.

The pack consists of:-

- A special PC version of the most advanced commercial boundary element software program, BEASY Version 7, with full functionality but with a limit of thirty two-dimensional, and eighty three-dimensional elements, and the full manuals on the CD.
- It also includes fundamentals and applications User Guides, and three books from WIT Press, the leading publisher in Boundary Elements. Each of the latter provides a thorough introduction to one of the specific areas highlighted, including relevant theory and applications.

The BEASY CD-ROM also contains full on-line documentation, guide books, background technical papers and application notes and can be run on PCs using Windows NT or Windows 95.

ISBN: 1-85312-339-0; 1-56252-263-9
(US, Canada, Mexico)   2000
£350.00/US$544.00

Boundary Integral Methods in Fluid Mechanics

H. POWER and L. WROBEL, Wessex Institute of Technology, UK

Using the Boundary Element Method, this book brings together classical and recent developments on the application of integral equation numerical techniques for the solution of fluid dynamic problems. Part One reviews the fundamental principles and equations governing the fluid motion, while Part Two presents formulations and applications of the BEM as the basis for numerical solution of inviscid and viscous flow problems.

ISBN: 1-85312-252-1; 1-56252-176-4
(US,Canada,Mexico)   1995   344pp
£77.00/US$118.00

Boundary Elements
An Introductory Course
Second Edition

C.A. BREBBIA, Wessex Institute of Technology, UK and J. DOMINGUEZ, University of Seville, Spain

This best-selling text provides a simple introduction to the Boundary Element Method. Based on the authors' long teaching experience it is designed to convey in the most effective manner the fundamentals of the method. The book is presented in a way which makes it accessible to both undergraduate and graduate students as well as to practising engineers who want to learn the foundations of the technique. Of particular interest is the way in which Boundary Element concepts are introduced and immediately applied in simple, but useful, computer codes – 4 for potential and 2 for elasticity – to facilitate understanding. A diskette with the complete listing of program codes in Fortran is also included.

ISBN: 1-85312-349-8; 1-56252-273-6
(US, Canada, Mexico)   Reprinted 1996
328pp + Diskette   £117.00/US$188.00
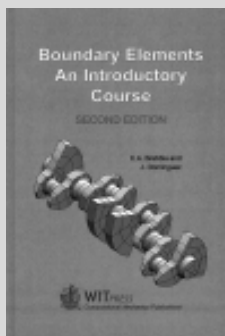
The Boundary Element Method for Solving Improperly Posed Problems

D.B. INGHAM and Y. YUAN, University of Leeds, UK

In this title the Boundary Element Method is applied to several problems which arise in inverse heat conduction to establish a sound basis on which to build solution procedures. The minimal energy technique is introduced to modify the BEM for solving problems which are improperly posed. The results indicate that excellent convergence and stable numerical approximate solutions may be obtained.

Series: Topics in Engineering, Vol 19
ISBN: 1-85312-291-2; 1-56252-215-9
(US, Canada and Mexico)   1994   160pp
£64.00/US$98.00

Boundary Elements Reference Database

Compilers: M.H. ALIABADI and C.A. BREBBIA, Wessex Institute of Technology, UK and J. MACKERLE, Linkoping University, Sweden
Software developer: J.L.F. LOPEZ

The **Boundary Elements Reference Database** is an extensive source of fundamental references for boundary element practitioners.

- Features comprehensive search facilities for over 7,000 references.
- Provides an extensive list of BEM references and abstracts from journals, books, conferences, technical reports and theses up to and including 1994.
- Contains a review of historical developments in the BEM.

Hardware Requirements: PCs with at least 2MB of available RAM; Windows 3.1, and DOS Version 5.0 or higher; 6MB of hard disk space.
ISBN: 1-85312-292-0; 1-56252-216-7
(US, Canada, Mexico)   1995
£194.00/US$298.00

Anisotropic Analysis using Boundary Elements

N.A. SCHCLAR, Wessex Institute of Technology, UK

"…exceptionally clearly organized and written… has lasting value."
AMERICAN SOCIETY OF MECHANICAL ENGINEERS

In this work the Boundary Element Method is applied to three-dimensional anisotropic elasticity. The use of the anisotropic and the isotropic fundamental solutions is also studied, and a boundary-only formulation produced.
Series: Topics in Engineering, Vol 20
ISBN: 1-85312-333-1; 1-56252-257-4
(US, Canada, Mexico)   1994   168pp
£59.00/US$91.00

Boundary Element Technology XI

Editors: R.C. ERTEKIN, University of Hawaii, USA, C.A. BREBBIA, Wessex Institute of Technology, UK, M. TANAKA, Shinshu University, Japan and R. SHAW, SUNY, Buffalo, USA

The proceedings of the eleventh international conference on this topic.
ISBN: 1-85312-394-3   1996   440pp
£128.00/US$192.00

The Multiple Reciprocity Boundary Element Method

*Editors: **A.J. NOWAK** and **A.C. NEVES**, Wessex Institute of Technology, UK*

This title describes multiple reciprocity method (MRM), one of the most successful Boundary Element Methods designed to avoid internal discretization.
After a review of MRM fundamentals, succeeding chapters apply the method to potential problems, the Helmholtz equation, eigenvalue analysis of the Helmholtz equation, neutron diffusion problems, vibration problems, elasticity problems, and low Reynolds numbers with inertial and non-permanent effects.
Series: Computational Engineering
ISBN: 1-85312-277-7; 1-56252-201-9
(US, Canada, Mexico)   1994   256pp
£72.00/US$110.00

Boundary Elements in Dynamics

***J. DOMINGUEZ**, Escuela Superior de Ingenieros Industriales, Seville, Spain*

An excellent, easy-to-follow reference for researchers, engineers, scientists and graduate students who need to acquire detailed knowledge of the formulation, implementation, and practical applications of BEM in dynamics. The author presents research on the Boundary Element Method in dynamics of continua. The main emphasis is on the development of the different boundary element formulations for time-dependent problems and the necessary mathematical transformations to produce computer codes which are able to solve scalar, elastic and poroelastic wave propagation problems.
Series: Computational Engineering
ISBN: 1-85312-258-0; 1-56252-182-9
(US, Canada, Mexico)   1993   724pp + Disk
£235.00/US$376.00
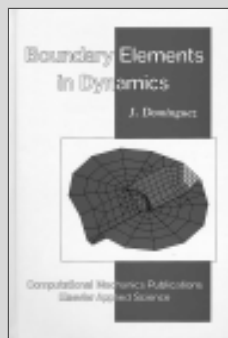
A Learning Tool for Engineers
Boundary Element Method Educational Package

*Compilers: **C.A. BREBBIA** and **R.A. ADEY**, Wessex Institute of Technology, UK*

The **Boundary Element Method Educational Package** introduces the user to the fundamentals of Boundary Element Method and the engineering problems to which it can be applied. The package is designed to enable students, researchers and practising engineers to learn the BEM step by step. It can be used at undergraduate or graduate level and also provides an effective introduction for users in industry.
Please note - BEASY manuals are supplied electronically on CD-ROM. User Guides are in printed format.
Contents:
* *A Boundary Element Method teaching guide with course notes.* The guide describes the contents of the package and explains how it can be used to teach yourself or an undergraduate or graduate course.
* *A best-selling book on Boundary Elements.* The textbook **Boundary Elements: An Introductory Course**, gives a simple and up-to-date introduction to BEM, and provides in the most effective manner, the fundamentals of the method.
* *A diskette of programs contained in the book.* This has a complete listing of program codes in Fortran.
* *A video on basic Boundary Element concepts and applications.* The video, which runs for approximately 10 minutes, outlines the main advantages of BEM.
* *Membership of the International Society for Boundary Elements (ISBE).* ISBE membership includes a year's subscription to the **Boundary Element Newsletter** (see p59)
* *BEASY PC version.* BEASY MECHANICAL DESIGN allows comprehensive design of engineering components and structures under static stress and thermal loading and coupled thermal stress analysis. The BEASY MECHANICAL DESIGN Teach Yourself Package Licence is for five concurrent users enabling them to create, display and analyse models with up to 100 elements.
* *A BEASY self-teaching guide on how to use the program.* This guide is a training course in the use of BEASY and its pre/post processor BEASY-IMS.
* *The BEASY user manual, with full descriptions on modelling of engineering problems.* This CD-ROM manual describes the data required in loads, material properties, etc. to perform a BEASY analysis.
* *A set of slides describing BE applications.* These can be used by an instructor to emphasise the importance of BEM in engineering practice.
ISBN: 1-85312-255-6; 1-56252-179-9   1993
£1,990.00/US$2,600.00

Transport Analysis using Boundary Elements

***P.W. PARTRIDGE**, Wessex Institute of Technology, UK*

Contents:
* *Diskette* - containing source code, data files and output files for each of the examples, file containing simple operating instructions and executable. The program is written to run on IBM PCs and compatibles. The source code is written in such a way that it may be easily understood by the user, and can be modified if required.
* *Manual* - covering operation of the software and introduction to fundamentals.
* *Book* - a detailed treatise on the Dual Reciprocity Boundary Element Method.
* *Applications* - 1. Isotropic Diffusion 2. Orthotropic Diffusion 3. Diffusion-Convection with Constant Velocity 4. Diffusion-Convection with Variable Velocity.
ISBN: 1-85312-194-0; 1-56252-122-5
(US, Canada, Mexico)   1993
£330.00/US$506.00

Boundary Element Methods in Transport Phenomena

***P.A. RAMACHANDRAN**, Washington University, St Louis, USA*

Provides readers with a complete understanding of the basics of BEM and includes descriptions of how to solve numerically a wide range of transport phenomena problems, especially in heat and mass transfer.
Series: Computational Engineering
ISBN: 1-85312-260-2; 1-56262-184-5
(US, Canada, Mexico)   1993   424pp
£111.00/US$170.00

Titles of Related Interest…

Boundary Element Applications in Fluid Mechanics...p34

Computational Electromagnetics using Boundary Elements...p48

Crack Growth Analysis using Boundary Elements...p39

NEW

Data Mining II

Editors: N.F.F. EBECKEN, COPPE/UFRJ, Federal University of Rio de Janeiro, Brazil, C.A. BREBBIA, Wessex Institute of Technology, UK and A. WEIGEND, New York University, USA

Data Mining is a new interdisciplinary field dealing with the discovery of hidden data and unexpected patterns and rules in large databases. Financial institutions have derived considerable benefits from its application, while other industries and disciplines are now applying the methodology to increasing effect.
In this book, which constitutes the proceedings of the Second International Conference on Data Mining, researchers and applications developers from academia and industry present original research and practical experiences in the diverse areas which make up Data Mining. They include computer experts, statisticians, knowledge acquisition specialists, data analysts, IT consultants, data visualisation experts as well as users and developers.
Topics covered include: Applications of Data Mining in Science, Engineering, Business, Industry and Medicine; Internet Applications; Fraud Detection and Prevention; Software; Neural Networks and Decision Trees; Parallel and Distributed Techniques; and Case Studies.
Series: Management Information Systems
ISBN: 1-85312-821-X 2000 apx 400pp apx £120.00/US$189.00

Data Mining

Editor: N.F.F. EBECKEN, COPPE/UFRJ, Federal University of Rio de Janeiro, Brazil

Illustrating recent advances in data mining problems, encompassing both original research results and practical development experiences, this book features the proceedings of the First International Conference on Data Mining. Contributions from academia and industry, covering such diverse areas as machine learning, databases, statistics, knowledge acquisition, data visualization and knowledge-based systems are included. The papers are divided under the following headings: Invited Technical Conference; Data Mining Methods I & II; Neural Networks Applications; Mining from Databases.
ISBN: 1-85312-677-2 1998 464pp £139.00/US$228.00

NEW

Applications of High-Performance Computing in Engineering VI

Editors:, M. INGBER, University of New Mexico, USA, H. POWER and C.A. BREBBIA, Wessex Institute of Technology, UK

High performance computing has evolved into an extremely powerful tool for solving a wide variety of problems in modelling and simulation. This book features papers from the Sixth International Conference on Applications of High-Performance Computing in Engineering, the latest in a highly successful series which provides a forum for scientists from many fields and countries to exchange ideas and information. Contributions come from researchers and practitioners in academia, industry and government, and cover a wide range of topics such as fluid flow, structural mechanics, material processing, efficient broadcasting algorithms, and data mining.
Almost 50 papers are included and these are divided under the following headings: Applications in Parallel Computing; Parallel Finite and Boundary Elements; Algorithms for Parallelisation; Applications of Neural Computing; Performance and Benchmarking; Applications in Fluid Flow; Distributed Computer Systems and Networking; Further Applications in Computational Science.
Series: Advances in High Performance Computing, Vol 6
ISBN: 1-85312-810-4 2000 512pp £148.00/US$238.00

NEW

Applied Virtual Instrumentation

R. BAICAN, Adam Opel AG, Germany and D.S. NECSULESCU, University of Ottawa, Canada

This textbook covers the fundamental knowledge and practical solutions required to interface sensors with a PC using the new framework of virtual instrumentation.
The authors focus on the knowledge required by a non-specialist to develop a modern monitoring system, i.e. connect sensors to a PC, condition their signals when required, and store and process the data using digital signal processing subroutines available in commercial virtual instrumentation packages.
- Specifically written for senior undergraduates in engineering and science, and practising engineers and researchers interested in using computer based instrumentation but with a limited knowledge of process monitoring software.
- Contains numerous numerical and programming examples using LabVIEW, HP VEE and MATLAB.
- Includes a CD-ROM with extensive illustrative examples of virtual instrumentation systems development.

ISBN: 1-85312-800-7 2000 apx 276pp + CD-ROM apx £85.00/US$138.00

Applications of High-Performance Computing in Engineering V

Editors: H. POWER, Wessex Institute of Technology, UK and J.J. CASARES LONG, Centro de Supercomputacion de Galicia, Spain

Containing the proceedings of the fifth international conference on this topic, this title focuses on the current and future abilities of high-performance computing to solve complex engineering problems.
Partial Contents: Algorithms for Parallelisation; Distributed Computer Systems and Networking; Massively Parallel Systems; Performance and Benchmarking; Visualisation and Graphics; Transputer Applications; Distributed Scheduling.
Series: Advances in High Performance Computing, Vol 3
ISBN: 1-85312-457-5 1997 352pp £99.00/US$159.00

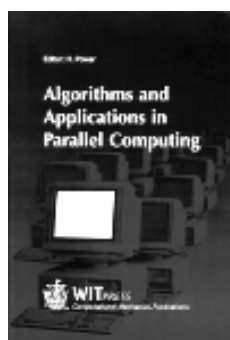# Algorithms and Applications in Parallel Computing

Editor: **H. POWER**, *Wessex Institute of Technology, UK*

Parallel computing involves the division of a complicated program into smaller tasks which are then performed simultaneously by several processors, thus reducing the total execution time dramatically. However this process raises several new issues, including task allocation and communication between processors, which do not appear in normal serial computing. Containing a selection of invited review articles, this book covers issues central to parallel computing algorithms.
- Features chapters on both general analysis and practical applications.
- Places particular emphasis on a variety of applications in engineering.
- Designed specifically to increase awareness of the potential of parallel computing amongst engineers and scientists.

Series: Advances in High Performance Computing, Vol 4
ISBN: 1-85312-511-3   1999   312pp
£95.00/US$148.00

Software Quality Engineering

Editors: **C. TASSO** and **M. PIGHIN**, *University of Udine, Italy and* **R.A. ADEY**, *Wessex Institute of Technology, UK*

Designed to establish a greater understanding of software quality issues through an exchange of recent academic and industrial research, this book contains the proceedings of the First International Conference on Software Quality Engineering.
Partial Contents: Education; Quality and Reliability; Methodologies; Metrics; Testing and Validation; Object Orientation; Industrial Case Studies.
ISBN: 1-85312-403-6   1997   368pp
£118.00/US$188.00

Software

Software Process Assessment and Improvement

Editor: **T. ROUT**, *Software Quality Institute, Griffith University, Queensland, Australia*

One of the first in its field, and set apart from other products by its experimental flavour, this CD-ROM focuses on an area of increasing popularity, particularly in the defence and telecommunications sectors. The international team of contributors presents a wide-ranging view on the conduct and use of software process assessment, particularly in the context of improvement.
Chapter 1 presents an historical and organisational perspective, showing how the concepts of Software Process Assessment are linked to the philosophies of TQM. This is followed by a description of some theoretical perspectives. *Chapter 3* reports on the application of assessment-oriented approaches to a wide range of problem situations. In *Chapter 4* the quantitative validity of the assessment approach is explored while *Chapter 5* examines the Capability Maturity Model and the Bootstrap method - two of the principal approaches to process assessment. *Chapter 6* discusses assessment in Management Information Systems, employing case studies as illustrations. *Chapter 7* explores different approaches to assessment including the ISO-conforming quality systems. *Chapter 8* describes the developmental history of the quality management system of a leading Finnish software house. Finally, *Chapter 9* presents the Software Improvement Model - a new model for software process assessment and improvement.
ISBN: 1-85312-609-8   1998
Book on CD-ROM   £59.00/US$98.00

Software

Implementing a Quality Management System

Editor: **D.N. WILSON**, *University of Technology, Sydney, Australia*

Global competition and the gradual removal of barriers to free trade are creating increasing opportunities for co-operation and worldwide trade in the information technology industry. This new order requires the adoption of adequate standards and quality management systems (QMS). In this CD-ROM the contributors provide advice and document experience in implementing such systems.
Chapter 1 discusses how to interpret QMS standards to provide a simple path to implementing a QMS in a software development environment. This is followed by a description of the need to analyse fundamental business strategies and current technology trends in order to position process improvement as a key business strategy. In *Chapter 3*, an industrial production approach to software is examined and it is suggested that lessons for the software industry can be learned from industrial manufacturing. The author of *Chapter 4* describes the experience gained over a number of years using software measurement and its introduction to organisations developing software products and systems. The final two chapters review the difficulties in implementing a QMS in small organisations.
ISBN: 1-85312-593-8   1998
Book on CD-ROM   £59.00/US$98.00

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High-Performance Computing in Engineering

Editors: **H. POWER** and **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

These two volumes contain a selection of invited review articles covering a variety of topics on high-performance computing in engineering. The sixteen chapters have been contributed by leading authors in the field.

Volume 1 - Introduction and Algorithms

Partial Contents: Introduction into Fundamentals of Distributed High-Performance Computing Systems in Engineering; A Critical Discussion on Supercomputer Architectures for Engineering Applications; Costs and Benefits of Parallelising Efficient Sequential Codes.
**ISBN: 1-85312-379-X; 1-56252-303-1
(US, Canada, Mexico) 1995 304pp
£85.00/US$130.00**

Volume 2 - Applications to Partial Differential Equations

Partial Contents: The Alternating Group Explicit Method for Solving Two and Three-Dimensional Elliptic Partial Differential Equations; A Comparison of the Computational Efficiency and Accuracy of Two Algorithms for Solving Convective Heat Transfer Problems on Supercomputers; Time-Parallelism for the Massively Parallel Solution of Parabolic PDEs.
**ISBN: 1-85312-380-3; 1-56252-304-X
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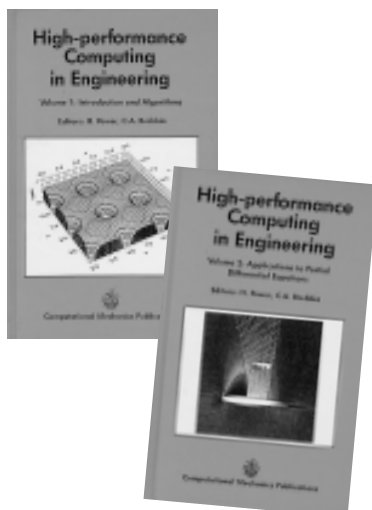
Building Object-Oriented Systems
An Introduction from Concepts to Implementation in C++

R.E. CALLAN, Southampton Institute, UK

"A very good book."
REVUE DES QUESTIONS SCIENTIFIQUES

This book gives a concise overview of object-oriented concepts and the use of C++ for program implementation. It provides the reader with enough knowledge to implement OO concepts in C++ but, unlike the majority of books on this subject, emphasis is placed on problem representation. The author examines why representation is important, how object-oriented concepts provide the basis for an expressive representation language, and how these concepts aid program development. Numerous examples of both representation and programs in C++ are provided and exercises are used to reinforce the student's understanding. A disc of source code listings is included.
Partial Contents: Fundamental Concepts; Semantic Nets; Frames; Connectionist Nets; Some Language Fundamentals - Scope and Life of Variables; Looping; Conditional Statements; Class - Encapsulation; Member Function Definition; Inheritance - String Example; Operator Overloading - Unary Example, Binary Example; Genericity - An Example of Class Template; Streams - Basic Input-Output; Formatting; Manipulators; Using Templates to Define Container Classes - Analysis and Design - Object Modelling Technique (OMT); A Data Compression Application - Huffman Coding; Neural Network Application - The Feedforward Backpropagation Network.
**ISBN: 1-85312-340-4; 1-56252-264-7
(US, Canada, Mexico) 1994 304pp
£52.00/US$80.00**
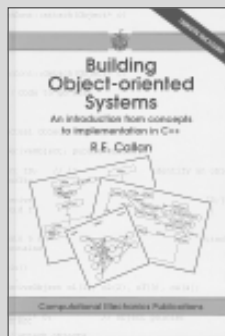
Information Technology for the 21st Century
Managing the Change

M.V.R. RODRIGUEZ, Petrobrás S.A., Brazil and **A.J. FERRANTE**, *UFRJ, Brazil and ISC/TSO, Italy*

"…a uniquely integrated view." *InTECH*

Bridging the gap between texts which cover complex technical aspects of information technology and those that concentrate solely on business and management techniques, this book provides a down-to-earth but detailed analysis of the transition from the traditional business organisation to a more competitive framework. The authors' approach provides for the effective support of information, implemented by the emerging computer architectures based on distributed IT. They show how to face and organise the process of change, and how to operate in the new environment once the change has been made. In particular they highlight the fundamental concepts concerning business and information for the 21st century, discussing the obstacles to be overcome and the relevancy of the results to be achieved.
Topics discussed, using a practical 'what-to-do' approach, include total quality management, strategic planning, business process re-engineering, information network implementation and management, system integration, modern technological architecture, client/server distributed IT, open systems architecture, and management of human resources in the context of change. Many practical examples are also included.
**ISBN: 1-85312-423-0; 1-56252-341-4
(US, Canada, Mexico) 1996 320pp
£89.00/US$134.00**

Software Engineering in Higher Education II

Editors: **J-L. USÓ**, *Universitat Jaume I, Spain,* **P. MITIC** and **L.J. SUCHAROV**, *Wessex Institute of Technology, UK*

Disseminating the experiences of the many institutions around the world, this book contains the proceedings of the Second International Conference on Software Engineering in Higher Education.
Papers are divided under the following headings: Educational Issues; Engineering Software; and Software Engineering.
**ISBN: 1-85312-385-4; 1-56252-309-0
(US, Canada, Mexico) 1995 416pp
£124.00/US$190.00**

Wave Motion in Earthquake Engineering

Editors: E. KAUSEL, Massachusetts Institute of Technology, USA and G.D. MANOLIS, Aristotle University, Thessaloniki, Greece

Containing state-of-the-art information on key new developments in seismic wave propagation, this volume features invited contributions from a select group of researchers whose work has recently been the focus of attention in journals and at conferences. It is designed to appeal to a broad audience of professionals working in the fields of structural dynamics, seismology, and earthquake engineering in general.

Contents: Fundamentals of Elastic Wave Propagation for Site Amplification Studies - the Seismic Response of Alluvial Valleys; Wave Propagation in Complex Geological Structures and their Effects on Strong Ground Motion; Spatial Variability of Seismic Motions Recorded over Extended Ground Surface Areas; Elastic Layered Half-Spaces Subjected to Dynamic Surface Loads; The Thin-Layer Method in Seismology and Earthquake Engineering; Elastic Waves in One-Dimensionally Layered Heterogeneous Soil Media; Waves in Vertically Inhomogeneous Soils; Steady-State Dynamic Response of Poroelastic Media; Fluid-Soil-Structure Interaction.

Series: Advances in Earthquake Engineering, Vol 5

ISBN: 1-85312-744-2   2000   376pp
£113.00/US$178.00

Earthquake Resistant Engineering Structures II

Editors: G. OLIVETO, Universita degli Studi di Catania, Italy and C.A. BREBBIA, Wessex Institute of Technology, UK

Featuring state-of-the-art research together with specific case histories, this volume contains a selection of contributions presented at the Second International Conference on Earthquake Resistant Engineering Structures. The papers are divided into the following sections: Reinforced Concrete Structures; Bridges; Building Structures; Ground Motion and Side Effects; Seismic Design Criteria; Earthquake Resistant Design; Historic Buildings and Monuments; Soil Structure Interaction; Seismic Isolation and Control; Soil Dynamics; Case Studies; and Retrofit.

Series: Advances in Earthquake Engineering, Vol 4

ISBN 1-85312-689-6   1999   848pp
£247.00/US$395.00

Stochastic Structural Dynamics
With Applications in Earthquake Engineering

G.D. MANOLIS, Aristotle University, Thessaloniki, Greece and P.K. KOLIOPOULOS, Technical Institute, Serres, Greece

Designed as both a textbook and a reference volume, this new title applies stochastic structural dynamics to typical problems in earthquake engineering. The authors first develop the standard material on random vibrations of single degree of freedom (DOF) systems, multiple DOF systems, nonlinear systems and continuous systems. They then move on to explore numerical methods (FEM and BEM) for stochastic dynamics, and to present case studies on random field simulations and risk analysis for earthquake-induced loads.

- Focuses on earthquake engineering unlike most texts which concentrate on mechanical vibrations.
- Includes many examples and exercises together with solutions.
- Particularly suitable for use by civil engineering students specialising in structural engineering and earthquake engineering, and mechanical engineering students studying random vibrations.

Contents: Stochasticity in Engineering Systems; Random Variables and Processes; Single DOF System Response to Random Input; Multiple DOF System Response to Random Input; Response of Nonlinear Systems to Random Input; Response of Continuous Systems to Random Input; Random Field Simulations; Numerical Methods in Stochastic Dynamics; Risk Analysis of Structures.

Series: Advances in Earthquake Engineering

ISBN: 1-85312-851-1   2000
apx 300pp   apx £89.00/US$145.00
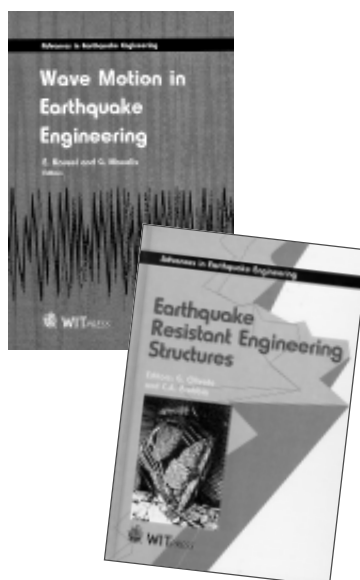
Seismic Isolation

P. KOMODROMOS, Massachusetts Institute of Technology, USA

Ground motion due to earthquake excitation often induces disastrous disturbances that severely damage structures and their contents. Conventional earthquake-resistant design focuses on the strengthening of structures to avoid collapse, while little attention is paid to the prevention of damage as it is almost impossible to construct completely "earthquake proof" structures at reasonable cost.

This state-of-the-art volume explores seismic isolation as an alternative and performance-based design approach to minimise earthquake induced loads and resulting damage in low to medium-rise buildings. A discussion of the characteristics, advantages and limitations of seismic isolation is followed by a demonstration of its capability to decouple a structure from the damaging effects of ground acceleration.

- Describes currently used seismic isolation systems in detail.
- Evaluates the performance of seismically isolated structures and provides examples of their response under earthquake action.
- Proposes a preliminary design methodology for seismically isolated structures.
- Accessible to both students and practising structural engineers who need to familiarise themselves with this approach.

Series: Advances in Earthquake Engineering

ISBN: 1-85312-803-1   2000   apx 200pp
apx £59.00/US$96.00

The Kobe Earthquake
Geodynamical Aspects

Editor: C.A. BREBBIA, Wessex Institute of Technology, UK

Contains scientific reports and analyses of the Kobe earthquake now available from Japanese researchers.

Partial Contents: The Seismotectonic Setting of the Kobe Area - the Concomitant Geodynamic Phenomena of the Hanshin Earthquake; Strong Ground Motion during the 1995 Hyogo-Ken Nanbu Earthquake; Why the Heaviest Damages Occurred in Kobe during the Hyogo-ken Nanbu Earthquake; Damage and Restoration of Lifelines during the 1995 Great Hanshin Earthquake; A Comparative Study on Typical Measures of Earthquake Preparedness in Local Governments between Japan and USA.

Series: Advances in Earthquake Engineering, Vol 1

ISBN: 1-85312-430-3; 1-56252-345-7
(US, Canada, Mexico)   1996   160pp
£85.00/US$138.00

NEW

Dynamic Structural Design
### Inverse Problem Approach

I. TAKEWAKI, Kyoto University, Japan

This book introduces a new dynamic structural design approach using inverse problem formulations to overcome several problems in the rationalization and systematization of structural design processes. A new direction for seismic-resistant design founded on the concept of performance based design is also proposed. Most of volume is based on the author's own work, and much of the contents has not been previously published.

Simple models are included in each chapter, thus enabling readers to understand the new concepts and formulations, while many references, both directly relevant and from related fields, are provided to aid those who wish to study the subject in more depth.

Contents: Introduction; Fully Inverse Problems; Hybrid Inverse Problems; Incremental Inverse Problems; Design for Fixed-Base Models; Design under Soil-Structure Interaction; Multi-Objective Structural Design; Design via Passive Control; Future Directions.

Series: Advances in Earthquake Engineering, Vol 6

ISBN: 1-85312-745-0 2000 280pp
£89.00/US$145.00
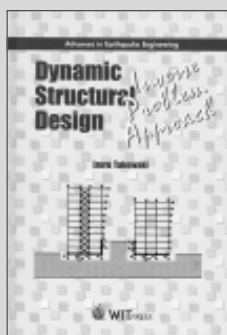
Earthquake Resistant Engineering Structures

Editors: G.D. MANOLIS, Aristotle University, Thessaloniki, Greece, D.E. BESKOS, University of Patras, Greece and C.A. BREBBIA, Wessex Institute of Technology, UK

The proceedings of the First International Conference on Earthquake Resistant Engineering Structures. Among the topics featured are: Engineering Seismology; Soil Structure Interaction; Stochastic Analysis Methods; Reinforced Concrete Structures; Seismic Isolation and Control; Historical Buildings and Monuments; Offshore Structures; Underground and Lifeline Structures; Storage Tanks; and Silos and Other Industrial Structures.

Series: Advances in Earthquake Engineering, Vol 2

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Editors: D.E. BESKOS and S.A. ANAGNOSTOPOULOS, University of Patras, Greece

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Soil Dynamics and Earthquake Engineering VII

Editors: A.S. ÇAKMAK, Princeton University, USA and C.A. BREBBIA, Wessex Institute of Technology, UK

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Introduction to Motion Based Design...p50

Risk Analysis II...p23

Structures under Shock and Impact V...p50

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K. HAMEYER and R. BELMANS, Katholieke Universiteit, Belgium

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Editors: A. KONRAD, University of Toronto, Canada and C.A. BREBBIA, Wessex Institute of Technology, UK

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Although they address common goals, the software topics covered are very broad, spanning numerical algorithms, data structures, aspects of programming methodology and user interface designs. The application areas represented are equally diverse, ranging from classical electromechanics to quantum electronics and even virtual reality systems. Contributions are divided under the following headings: Package Design; Interfaces; Software Engineering; Numerical Methods; Symbolic Computation; Parallel Computation; Simulation.

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*Editor: **P.R.P. HOOLE**, Nanyang Technological University, Singapore*

Four highly advanced technologies – biomedical imaging, radar, navigation and remote sensing – have brought the importance of electromagnetic imaging into prominence. Because of the relatively independent development of these technologies, however, there has so far been little attempt to put together a unified approach to the electromagnetic imaging principles that are applicable to all four disciplines. This volume fills this gap. It introduces research and development engineers, graduate students and senior undergraduate students to the basic principles and techniques involved in electromagnetic image reconstruction and image processing.

An attractive feature of the book is that in addition to covering the fundamental science behind imaging and the algorithms most commonly used, it also provides technological implementation examples of imaging. All the concepts and applications of electromagnetic imaging considered essential are discussed, while the programs listed will be of help to beginners who require a starting point for reconstructing images, as well as for manipulating and processing these. Signal processing is addressed at the levels of both images and the time domain electromagnetic signals and basic tools available for processing images are described. The application of wavelets and wavelet transforms to electromagnetic imaging systems is presented as a general approach to processing and understanding electromagnetic images. Providing wide-ranging, yet detailed, coverage, **Electromagnetic Imaging in Science and Medicine** features the following chapters: Introduction; Fundamentals of Image Processing; Signals in Science and Medicine; Fundamentals of Image Reconstruction; Mathematics of Signals and Image Reconstruction; Wavelet Transforms for Electromagnetic Images; Magnetic Resonance Signal Analysis Using Wavelets; Vision-Based Underwater Cable Tracking; Three-Dimensional Image Reconstruction; References.
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*Editor: **P.R.P. HOOLE**, Nanyang Technological University, Singapore*

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Editor: A. GARCIA, Universidad de Valencia, Spain

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Ecosystems and Sustainable Development II

Editors: C.A. BREBBIA, Wessex Institute of Technology, UK and J-L. USO, Universitat Jaume I, Spain

The tasks facing ecologists now require the collaboration of scientists, engineers, economists and other professionals such as those participating in ECOSUD II, the Second International Conference on Ecosystems and Sustainable Development.
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Series: Advances in Ecological Sciences, Vol 2
ISBN: 1-85312-687-X   1999   416pp
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Life and Environment in the Mediterranean

Editor: L. TRABAUD, Centre for Functional and Evolutive Ecology, France

Presenting contemporary results in ecology and dynamics in the Mediterranean Basin, this is the first book to deal with the complex and diverse geo-ecological issues facing the area as a whole, and to provide a critical synthesis of information previously scattered throughout many journals and other publications. The contributors call into question the long-term sustainability of current development processes in the region and discuss how to preserve its natural biodiversity. This up-to-date and unique review of work in the field will be of interest to those who manage the environment, scientists in general, and everyone concerned with the Mediterranean biota.
Contents: Functioning and Dynamics of Woody Plant Ecosystems in Galicia (NW Spain); History of Landscape Changes in Northwest Spain According to Land Use and Management; Functioning and Dynamics of Plant Communities in Central and Southern Spain; Ecology of Post-Fire Recovery in *Pinus Halepensis* in Southern Italy; Phenology of East Mediterranean Vegetation; Stress-Induced Effects on *Quercus ilex* under a Mediterranean Climate - Contribution of Chlorophyll Fluorescence Signatures; Seeds - Their Soil Bank and Their Role in Post-Fire Recovery of Ecosystems of the Mediterranean Basin; Landscape Dynamics and Bird Diversity in the North Mediterranean Basin - Conservation Issues; Restoration for Soil Protection after Disturbances; Environmental Conservancy Strategies in the Mediterranean Islands.
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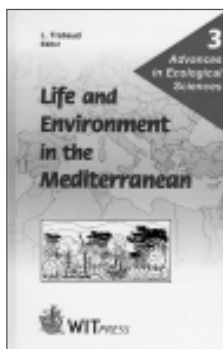
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Contents: Fundamentals of the Theory of Response Function Method; ONTOMOD - the Model of Ontogenesis in Higher Plants Using Soybean as an Example; POLMOD.RAD - the Model of ^{90}Sr Dynamics in the Elementary Ecosystems; POLMOD.PEST - the Model of Pesticides Dynamics in the Elementary Ecosystems; HUMOD - the Model of Humus Formation in Soils of Natural and Agricultural Systems; Development of Environmental Indices Using the Method of Response Function.
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*Editors: **T.V. DUGGAN**, Wessex Institute of Technology, UK and **C.A. MITCHELL**, University of Queensland, Australia*

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Chapters featured include: Environmental Engineering and its Impact on Engineering Education; Integrating the Environmental Dimension in Engineering Education; Sustainable Development and its Relevance to Environmental Engineering Education; Energy and the Environment; and Environmental Engineering in Nuclear Engineering Education.

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apx £120.00/US$189.00

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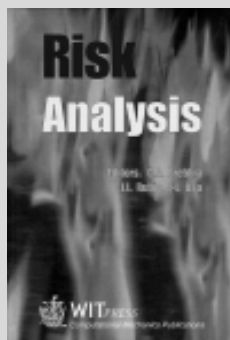
NEW

Development and Application of Computer Techniques to Environmental Studies VIII

Editors: **C.A. BREBBIA**, *Wessex Institute of Technology, UK,* **G. IBARRA-BERASTEGUI**, *University of the Basque Country, Spain and* **P. ZANNETTI**, *Exponent Inc., California, USA*

This volume presents the most recent developments and practical implementations in the theoretical, numerical and applicable aspects of computer analysis, simulation, modelling, control and forecasting for environmental applications. Enlightening, informative and indicative of trends to come, the contributions come from managers, scientists and engineers attending the eighth international conference on this subject. Topics covered include: Health and Pollution; Fluid Dynamics; Environmental Management and Decision Analysis; Chemistry, Physics and Biology; Satellite Data, Image Processing and Remote Sensing; Renewable Energies; Data Bases; and Software Implementation.
Series: Environmental Studies
ISBN: 1-85312-819-8   2000   apx 550pp
apx £165.00/US$265.00

Development and Application of Computer Techniques to Environmental Studies

Editors: **D.W. PEPPER**, *University of Nevada, Las Vegas, USA,* **C.A. BREBBIA**, *Wessex Institute of Technology, UK and* **P. ZANNETTI**, *Exponent Inc., California, USA*

The proceedings of the Seventh International Conference on the Development and Application of Computer Techniques to Environmental Studies (ENVIROSOFT). Papers are divided under the following headings: Mathematical Modelling; Pollution – Air, Water, Soil, Noise and Radiation; Environmental Sciences and Engineering; Surface and Groundwater Hydrology; Meteorology and Climatology; Remote Sensing and GIS; Environmental Management and Decision Analysis.
Series: Environmental Studies, Vol 2
ISBN: 1-85312-606-3   1998   400pp
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Editors: **D. ALMORZA** *and* **H.M. RAMOS**, *University of Cadiz, Spain*

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Series: Environmental Engineering, Vol 4
ISBN: 1-85312-603-9   1998   360pp
£115.00/US$184.00

Measurements and Modelling in Environmental Pollution

Editors: **C.A. BREBBIA**, *Wessex Institute of Technology, UK and* **R. SAN JOSE**, *Technical University of Madrid, Spain*

"…there should be something in this book of interest to all ecosystem modellers."

ECOMOD

The proceedings of the First International Conference on Measurements and Modelling in Environmental Pollution. The 51 papers included are divided under the following headings: Water Pollution Modelling; Air Pollution and Meteorological Modelling; Data Analysis in Air Quality Modelling; Agriculture Pollution; Urban and Industrial Waste.
ISBN: 1-85312-461-3   1997   560pp
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Environmental Engineering Education and Training

Editors: **T.V. DUGGAN** *and* **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

Covering aspects of both education and technology under the sections Education and Training, Curriculum Development, Systems and Environmental Control, Water Treatment, Pollution and Control, Materials Utilisation and Waste Management, and Energy Conservation and Air Pollution, this book contains the proceedings of the First International Conference on Environmental Engineering Education and Training.
ISBN: 1-85312-393-5   1997   528pp
£89.00/US$134.00

Development and Application of Computer Techniques to Environmental Studies VI

Editors: **P. ZANNETTI**, *Failure Analysis Associates Inc, California, USA* and **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

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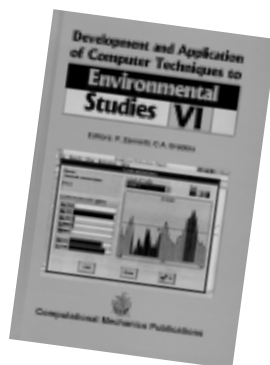
Partial Contents: Mathematical Modelling; Marine Geotechniques; Meteorology and Climatology; Fluid Dynamics; Satellite Data; Remote Sensing; Environmental Management.
ISBN: 1-85312-411-7   1996   700pp
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Series: Environmental Modeling, Vol 3
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Environmental Modeling - Volume 2

Computer Methods and Software for Simulating Environmental Pollution and its Adverse Effects

Editor: **P. ZANNETTI**, *Failure Analysis Associates Inc., California, USA*

"…a very attractive assortment of contributions from talented authors… I would highly recommend the book to all...who are serious about environmental modeling."
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Presenting a selection of invited review papers covering environmental modeling topics, this title is the second in an edited series. Each chapter has been written by a leading authority in the field and provides the reader with an organised and consistent discussion on mathematical and numerical simulation of environmental phenomena.
Series: Environmental Modeling, Vol 2
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(US, Canada, Mexico)   1994   384pp
£108.00/US$166.00

Air Pollution

NEW

Mesoscale Atmospheric Dispersion

Editor: Z. BOYBEYI, Science Applications International Corporation, Virginia, USA

The most serious problems to affect our atmospheric environment, such as urban air pollution, regional haze, acidic precipitation, and ozone depletion, occur over mesoscale travel distances and are consequently truly international in nature. In response to the increased awareness of these problems, many universities now offer interdisciplinary programs in environmental science while many government and private organisations also support environmental projects.

This new title fulfills the need for a suitable text for graduate students and professional researchers working in this field. It consists of thirteen chapters which review basic concepts, theories, and modelling issues of pollutant dispersal in the atmosphere and related atmospheric systems affecting transport, transformation, and removal of air pollutants over mesoscale travel distances.

Series: Advances in Air Pollution
ISBN: 1-85312-732-9   2000   apx 500pp apx £160.00/US$262.00

NEW

Air Quality Management

Editors: H. POWER, Wessex Institute of Technology, UK, J.W.S. LONGHURST, University of the West of England, UK and D.M. ELSOM, Oxford Brookes University, UK

A specially commissioned collection of papers providing details of operational experiences and on-going research projects in this increasingly important field. Developments in state-of-the-art air pollution models, emission inventories, public information and warning systems, transport and point source emission control strategies and programmes are covered. The authors are key researchers and practitioners with a range of experiences in urban-industrial areas in Europe, Asia, Australasia, Africa, North America and Central America.

Series: Advances in Air Pollution, Vol 7
ISBN: 1-85312-528-8   2000   apx 300pp apx £88.00/US$145.00

NEW

Air Pollution VIII

Editors: C.A. BREBBIA, Wessex Institute of Technology, UK, J.W.S. LONGHURST, University of the West of England, UK and H. POWER, Wessex Institute of Technology, UK

This book consists of papers presented at the Eighth International Conference on Air Pollution. The contributions are the work of scientists from industry, research organisations, government and academia who are involved with the monitoring, simulation and management of air pollution problems. They address experimental and computational techniques which can be used to understand and solve such problems, touching on topics including modelling chemical transformation, turbulence, and air pollution; transport emissions; health problems, and the monitoring and management of air quality.

Series: Advances in Air Pollution
ISBN: 1-85312-822-8   2000   apx 900pp apx £265.00/US$426.00

Air Pollution VII

Editors: C.A. BREBBIA, Wessex Institute of Technology, UK, M. JACOBSON, Stanford University, USA and H. POWER, Wessex Institute of Technology, UK

Features over 100 contributions from the Seventh International Air Pollution Conference. Topics discussed include turbulence modelling at small and meso scales, pollution engineering, pollution management, urban and suburban transport emissions, urban air pollution, emission inventories and modelling, health problems, indoor pollution, fluid mechanics for environmental problems, monitoring and field studies, chemistry of air pollution, air pollution modelling, aerosols and particles, and air pollution meteorology.

Series: Advances in Air Pollution, Vol 6
ISBN: 1-85312-693-4   1999   1,112pp £295.00/US$480.00

Landfill Emission of Gases into the Atmosphere

V. POPOV and H. POWER, Wessex Institute of Technology, UK

In this volume the authors describe a mathematical model for the solution of convection-diffusion flow of a mixture of gases in a multi-layer porous media, and apply this to the problem of the generation and migration of gases inside a landfill and their release into the atmosphere. They present two different boundary element formulations, based upon the dual reciprocity method (DRM), to transform the resulting domain integrals into surface integrals. Chapter 1 provides a brief introduction to the field plus numerical schemes previously applied to the problem. This is followed with introductory material about sanitary landfills and landfill gases, with an emphasis on the importance of the control of the emission of the gases. The foundations of the convection-diffusion flow of mixture of gases in a porous media, including a review of heat generation and transport theory, are then given and the BEM formulations for single-gas and multi-gas models are explained. Chapter 5 presents the domain decomposition concept and tests it on a variety of one- and two-dimensional problems. The DRM-MD concept is then described in more detail and the validity of the algorithm is verified through a number of numerical examples. Finally, the model is applied to the design of trenches in a multi-layer landfill.

Series: Advances in Air Pollution, Vol 4
ISBN: 1-85312-616-0   1999   200pp £75.00/US$120.00
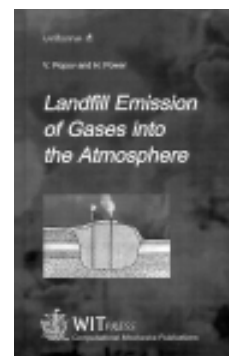
Measuring and Modelling Investigation of Environmental Processes

Editor: **R. SAN JOSE**, *Technical University of Madrid, Spain*

Written by scientists and researchers at the leading edge of the environmental sciences, this book covers topics in both observational and simulation data. The following chapters are included: Analysis of Urban Ozone Concentration; Data Assimilation in Air Pollution Models; A Study of Air Pollution Levels in Europe; Modelling Aerosol Composition and Processes in Air Pollution Applications; Methodology for the Analysis of Sulphate and Ammonium in Aerosols; Analysis of Long Term Concentrations of Heavy Metals in Air; A Comparison of Pollution Transport Models; A Sensitivity Study of Dry Deposition Fluxes; A Study of Surface Heat Turbulent Fluxes; Numerical Simulation of Wind Field over Complex Terrain; Simulation of Pollution Events in Northern Spain; Engineering Management and Decommissioning Program for Mine Salt Tailings.
Series: Environmental Engineering, Vol 2
ISBN: 1-85312-566-0   1999   376pp
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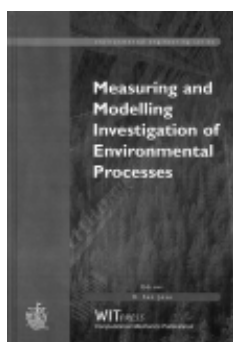
Air Pollution VI

Editors: **C.A. BREBBIA**, *Wessex Institute of Technology, UK*, **C.F. RATTO**, *Università di Genova, Italy and* **H. POWER**, *Wessex Institute of Technology, UK*

Containing many of the edited papers presented at the Sixth International Conference on Air Pollution, this volume comprises sections on the following topics: Chemical Transformation Modelling; Turbulence Modelling at Small and Meso Scales; Monitoring and Laboratory Studies; Data Analysis and Observation; Pollution Engineering; Pollution Management; Urban and Suburban Transport Emissions; Urban Air Pollution; Emissions Inventories; Health Problems; Damage to Cultural Heritage; Fluid Mechanics for Environmental Problems; Chemistry of Air Pollution; Air Pollution Modelling; Aerosols and Particles.
Series: Advances in Air Pollution, Vol 5
ISBN: 1-85312-605-5   1998   996pp
£280.00/US$425.00

Air Pollution Emissions Inventory

Editors: **H. POWER**, *Wessex Institute of Technology, UK and* **J.M. BALDASANO**, *Universitat Politécnica de Catalunya, Spain*

An indispensable tool for all researchers in the field, this book not only provides an idea of pollution sources but also gives essential information for future pollution modelling studies. It contains a selection of invited review articles covering various topics on emissions inventory and modelling and places particular emphasis on emission data in urban settings. The following chapters from distinguished contributors are featured: Guidelines and Formulation of an Upgrade Source Emission Model for Atmospheric Pollutants; Spatial and Temporal Disaggregation of Emission Inventories; Modelling the Emissions of Road Vehicles at Macroscale and Microscale; The Construction and Use of an Emissions Inventory for Local Air Quality Management; Validation and Verification of Emission Inventory Data; On the Forecasting of SO_2 Time Series.
Series: Advances in Air Pollution, Vol 3
ISBN: 1-85312-517-2   1998   256pp
£73.00/US$117.00
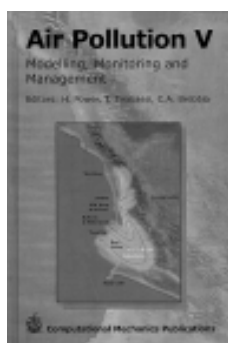
Air Pollution V
Modelling, Monitoring and Management

Editors: **H. POWER**, *Wessex Institute of Technology, UK*, **T. TIRABASSI**, *Institute FISBAT-CNR, Italy and* **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

"…much of the work represented here is of good quality and some, in fact, is exceptionally good."
BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY

Containing the proceedings of the Fifth International Conference on Air Pollution, this book places emphasis on the development of experimental and computational techniques which, when used as a tool for the solution and understanding of practical air pollution problems, can also be employed to evaluate proposed emission control techniques and strategies.
ISBN: 1-85312-473-7   1997   1,056pp
£255.00/US$395.00
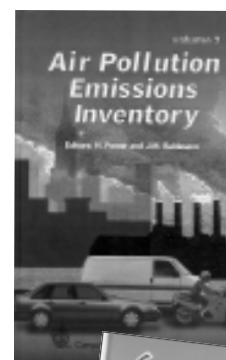
EUROTRAC

Editors: **P.M. BORRELL, P. BORRELL, T. CVITAS, K. KELLY and W. SEILER,** *EUROTRAC International Scientific Secretariat (ISS), Fraunhofer-Institute, Germany*

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ISBN: 1-85312-495-8 (2 volumes)   1997 1,948pp   £325.00/US$495.00

Urban Air Pollution
Volume 1

Editors: H. POWER, Wessex Institute of Technology, UK, N. MOUSSIOPOULOS, Aristotle University of Thessaloniki, Greece and C.A. BREBBIA, Wessex Institute of Technology, UK

The first in a series of publications on air pollution, this book contains a selection of invited review articles by leading authorities covering urban air pollution topics.
Partial Contents: Case Studies: Air Pollution in Athens; Air Quality Study for the City of Graz, Austria; Some Recent Advances on Air Pollution Reactivity in Mexico City; Effect of Tokyo Metropolitan Area on the Air Quality of the Kanto Plain; The Ecology of Urban Emissions.
Series: Air Pollution, Vol 1
**ISBN: 1-85312-331-5; 1-56252-255-8
(US, Canada, Mexico)   1994   336pp
£105.00/US$161.00**

Urban Air Pollution
Volume 2

Editors: H. POWER, Wessex Institute of Technology, UK and N. MOUSSIOPOULOS, Aristotle University of Thessaloniki, Greece

Continuing the theme of **Urban Air Pollution, Volume 1**, this book contains further papers by leading authors in the field of atmospheric pollution. Topics featured include: Perspectives of Sustainability in the Long-Range Transport of Air Pollutants; Air Pollution Levels and Trends in Major Urban Areas in Belgium; Influence of Emission Input Data on Ozone Level Predictions for the Upper Rhine Valley; Photochemical Smog Studies in Australian Cities; Air Quality in Historical Perspective: A Case Study of the Greater Manchester Conurbation.
Series: Air Pollution, Vol 2
**ISBN: 1-85312-372-2; 1-56252-296-5
(US, Canada, Mexico)   1996   272pp
£89.00/US$137.00**
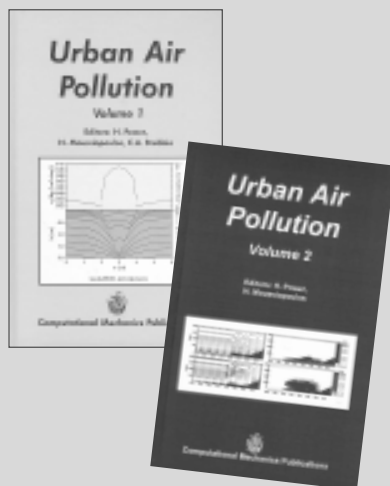
Air Pollution Modeling
Theories, Computational Methods and Available Software

P. ZANNETTI, AeroVironment Inc, Monrovia, USA

"…a comprehensive view of the subject of air pollution modelling. It provides both a historical perspective on the evolution of mathematical modelling techniques as well as a carefully developed survey of contemporary modelling methods."

BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY
**ISBN: 1-85312-100-2; 0-94582-484-X
(US, Canada, Mexico)   1990   448pp
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B. HENDERSON-SELLERS, University of New South Wales, Australia

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Water Pollution

NEW

Oil and Hydrocarbon Spills II
Modelling, Analysis and Control

Editors: G. RODRIGUEZ, University of Las Palmas de Gran Canaria, Spain, C.A. BREBBIA, Wessex Institute of Technology, UK and R. GARCIA-MARTINEZ, Universidad Central de Venezuela, Venezuela

The transport and fate of hydrocarbons in the sea is governed by complex oceanographic and physico-chemical interacting processes which makes oil spill research one of the most difficult challenges in present day science. The risk of spills still continues to overwhelm prevention measures and to create potential danger in sensitive natural environments.
Helping to close the gap between theoretical developments and practical applications, this book presents state-of-the-art techniques designed to model, prevent and control oil spills on land and in water. The papers featured come from the Second International Conference on this subject and include discussion of: Spills in Estuaries and Delta Areas; Operational Procedures for Storage, Handling and Transportation of Oil; Biological Impact of Oil Pollution; Biological Control Methods; Use of Dispersants; Oil Spill Treating Agents; In-Situ Burning; Experimental and Laboratory Analysis; Sensitivity Maps; Rehabilitation of Oil-Damaged Resources; and Recovered Oil Management.
Series: Water Studies
**ISBN: 1-85312-828-7   2000   apx 400pp
apx £120.00/US$189.00**

Oil and Hydrocarbon Spills
Modelling, Analysis and Control

Editors: R. GARCIA-MARTINEZ, Universidad Central de Venezuela, Venezuela, and Wessex Institute of Technology, UK and C.A. BREBBIA, Wessex Institute of Technology, UK

Containing edited versions of the papers presented at the Oil and Hydrocarbon Spills, Modelling, Analysis and Control Conference, this volume features coverage of the following topics: Modelling of Trajectory and Fate of Spills; Contingency Planning and In-Situ Countermeasures; Experimental and Laboratory Analysis; Shoreline Protection and Cleanup; Toxicity Testing; Risk Assessment; Field Experiments; Remote Sensing; Cleanup Measures; Case Studies.
Series: Water Studies, Vol 3
**ISBN: 1-85312-526-1   1998   384pp
£125.00/US$198.00**

NEW

Groundwater Pollution Control

Editor: **K.L. KATSIFARAKIS**, *Aristotle University, Thessaloniki, Greece*

Honoured in ancient wisdom as one of the four basic elements, water is now recognized as the most valuable natural resource. As demand steadily increases in the wake of population growth and improved quality of life, the sustainable management of water resources is becoming a more challenging task. One of the most important aspects of this management is groundwater pollution control which consists of several stages, including identification of pollution sources, field measurements, mathematical and numerical modeling of mass transport in different aquifer types and optimization of control measures and techniques. This book includes eight chapters that cover these stages. The first three deal with specific features of groundwater pollution caused by nitrates (i.e. non-point, agricultural sources), non-aqueous phase liquids (NAPLs) and viruses respectively, while the fourth examines seawater intrusion to coastal aquifers. The fifth chapter presents field measurements for groundwater quality assessment. Field tests are also discussed in the sixth chapter, which deals with the particular features of fractured porous media. Next the powerful optimization potential of genetic algorithms is reviewed, together with a number of relevant applications. Finally, a chapter on water resources management in arid islands concludes the volume.
Series: Progress in Water Resources, Vol 2
ISBN: 1-85312-675-6   2000   348pp
£112.00/US$183.00

Water Pollution V
Modelling, Measuring and Prediction

Editors: **P. ANAGNOSTOPOULOS**, *Aristotle University, Thessaloniki, Greece* and
C.A. BREBBIA, *Wessex Institute of Technology, UK*

Featuring the proceedings of the Fifth International Conference on Water Pollution, this book contains contributions from many different countries and covers a multitude of topics and techniques. Subjects covered include: Wastewater Treatment and Sewage Systems; Mathematical and Physical Modelling; Modelling as a Management Tool; Saltwater Intrusion; Biological Effects; Chemical and Nuclear Pollution; Pollution of Estuaries, Coastal Seas and Open Seas; Lakes, Rivers and Channels; Heavy Metals; Groundwater and Aquifer Contamination; Organic Contaminants; and Oil Spills.
Series: Progress in Water Resources, Vol 1
ISBN: 1-85312-685-3   1999   608pp
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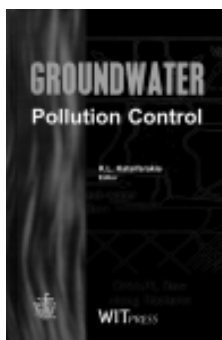
NEW

Environmental Coastal Regions III

Editor: **G. RODRIGUEZ,** *University of Las Palmas de Gran Canaria, Spain***, C.A. BREBBIA**, *Wessex Institute of Technology, UK* and **E. PEREZ MARTELL**, *University of Las Palmas de Gran Canaria, Spain*

The proceedings of the Third International Conference on Environmental Problems in Coastal Regions. Particular emphasis is placed on the development of computer models which can reproduce not only normal behaviour but also extreme conditions, and on practical applications currently carried out around the world.
Topics covered include: Pollution Management and Decision Analysis; Hazard Mitigation and Risk Analysis; Harbours, Ports and Marinas; Littoral Drift; Coastal Erosion; Oil Slicks and Spills; Acoustic Pollution; Sewage and Chemical Pollution; Atmospheric Pollution and Control; Water Quality Models; and Case Studies.
Series: Environmental Studies
ISBN: 1-85312-827-9   2000   apx 450pp
apx £138.00/US$222.00

Environmental Coastal Regions

Editor: **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

A selection of papers presented at the Second International Conference on Environmental Problems in Coastal Regions.
Contents: Environmental Impact Assessment; Coastal Management; Remote Sensing; Atmospheric Pollution; Water Pollution; Pollution Transport and Dispersion; Hydrodynamic Pollutant Transport Modelling; Coastal Structures; Groundwater Studies; Siltation and Dredging.
Series: Environmental Studies, Vol 1
ISBN: 1-85312-527-X   1998   456pp
£139.00/US$228.00

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Software

OilTrack

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A simple to use oil spill trajectory simulation software, **OilTrack** provides a powerful new contribution to the management of water pollution. It includes a two-dimensional hydrodynamic model to calculate wind or tidal generated water velocities and elevations in any complex geometry site. The oil trajectory model uses state-of-the-art 3-D particle tracking techniques to determine oil spreading and dispersion depending on oil properties, ocean diffusion and Fay's spreading regimes. Oil trajectories are calculated in 3-D water space allowing simulation of instantaneous or continuous spills.

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Water Pollution IV
Modelling, Measuring and Prediction

*Editors: **R. RAJAR**, University of Ljubljiana, Slovenia and **C.A. BREBBIA**, Wessex Institute of Technology, UK*

Focusing on state-of-the-art developments, this book contains the proceedings of the Fourth International Conference on Water Pollution. **Partial Contents**: Industrial and Domestic Pollution; Agricultural Pollution; Sewage Out Falls; Saltwater Intrusion; Methods for Pollution Studies; Remote Sensing; Hydrodynamic and Water Quality Modelling; Algae Growth; Wastewater Treatment; Sanitary Quality of Beaches and Bathing Waters.
ISBN: 1-85312-470-2   1997   832pp
£229.00/US$366.00

Nigerian Petroleum Business
A Handbook

*Editor: **V.E. EROMOSELE***

"This highly informative Handbook is structured in such a way that there is material for the prospective investor and financier, for the oil trader, for the oil industry manager, for the corporate planner, for the accountant and financial advisor, for the academic and not the least, for the general reader."

RILWANU LUKMAN, SECRETARY-GENERAL, OPEC from the Foreword

Contents: Introduction - Nigeria and the World of Oil; Overview of the Petroleum Industry; Understanding the People and Nigerian Environment; General Guide for Investors; Business Guide to the Upstream Sector; Business Guide to the Downstream Sector; Accountant's and Finance Manager's Guide.
ISBN: 978-33459-3-1   1997   559pp   £99.00
This title is not available from Computational Mechanics Inc. in the US. Please order from WIT Press in the UK.

Titles of Related Interest

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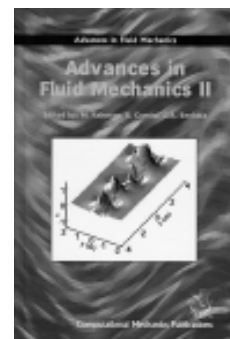
Advances in Fluid Mechanics II

*Editors: **M. RAHMAN**, Dalhousie University, Canada, **G. COMINI**, University of Udine, Italy and **C.A. BREBBIA**, Wessex Institute of Technology, UK*

Featuring papers presented at the Second International Conference on this topic, this book reviews developments in fluid research from basic mathematical formulations of fluid mechanics to computer modelling of fluid dynamic applications. Areas discussed include: Experimental versus Computational Methods; Hydro- and Aerodynamics; River, Lake and Estuary Fluid Dynamics; and Non-Newtonian Fluid.
Series: Advances in Fluid Mechanics, Vol 21
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£129.00/US$196.00

Advances in Fluid Mechanics Series

Flow-Induced Vibration

Theory and Practice

Editor: **P. ANAGNOSTOPOULOS**, *Aristotle University, Thessaloniki, Greece*

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Contents: Vortex-Induced Vibrations - Experiments and Computations; Mathematical Models for Vortex-Induced Vibration; Fluid-Structure Interaction in Hydraulic Turbomachinery; Vibrations of Tube Bundles in Cross-Flow; Vibrations of Rotors; Flow-Induced Noise; Vibrations of Cylinders in Two-Phase Flow; Vibration Mechanisms in Gates; Practical and Design Problems.
Series: Advances in Fluid Mechanics
ISBN: 1-85312-644-6   2000   apx 250pp apx £75.00/US$119.00

Nonlinear Water Wave Interaction

Editors: **O. MAHRENHOLTZ** *and* **M. MARKIEWICZ**, *Technische Universität Hamburg – Harburg, Germany*

This volume provides an important contribution to the evolution of the intriguing field of the physics of gravity waves. Recent progress in the areas of nonlinear wave-structure and wave-wave interaction is reviewed and special attention is paid to higher-order effects and their influence on the dynamic behaviour of marine and offshore structures.
- Features three chapters on the development of solution methods for nonlinear free surface flows.
- Presents four competitive approaches: desingularized method, Euler-Lagrangian approach with boundary elements, interface-tracking and interface-capturing methods in finite volume discretization.
- Discusses nonlinear diffraction loads on offshore structures, propagation of second-order Stokes waves in a laboratory wave tank, and water wave instability in three-dimensional radiation problems.
Covering both practical problems and mathematical methods, **Nonlinear Water Wave Interaction** will be invaluable to offshore engineers and naval architects. It will also be of interest to CFD scientists and applied mathematicians.
Series: Advances in Fluid Mechanics, Vol 24
ISBN: 1-85312-545-8   1999 eight-page colour section   272pp £95.00/US$148.00

Nonlinear Instability, Chaos and Turbulence

Volume 2

Editors: **L. DEBNATH**, *University of Central Florida, USA and* **D.N. RIAHI**, *University of Illinois, USA*

The second volume in this collection which demonstrates the importance of mathematical, computational and experimental techniques to the advancement of research in nonlinear instability, chaotic motions and turbulent flow systems.
Contents: Turbulence Evolution in Vortex-Dominated Flows; Archetypal Analysis of Data from Spatially Extended Dynamical Systems; Ginzburg-Landau Theory and Symmetry; Hydrodynamic Alpha-Effect in a Convective System; Dynamical Systems and the Kinematics Dynamo; Investigation of Fine-Scale Turbulence in Shear Flows using the PVC Technique; Burst Mechanisms in Hydrodynamics; Instability of Multi-Layer Flows; Thermal Effects and Plasma Absorption in Laser Materials Processing; Nonlinear Thermal Instability in Sperical Shells.
Series: Advances in Fluid Mechanics, Vol 25
ISBN: 1-85312-730-2   2000   424pp £127.00/US$199.00

Nonlinear Instability, Chaos and Turbulence

Volume 1

Editors: **L. DEBNATH**, *University of Central Florida, USA and* **D.N. RIAHI**, *University of Illinois, USA*

This collection of invited chapters has been written by fluid dynamicists and applied mathematicians who have made significant contributions to the areas of nonlinear flow instabilities, chaotic motion and turbulence. Containing original research, research-expository and survey articles, it provides a digest of current developments, together with open questions and unsolved problems which are likely to determine fruitful directions for future advanced study and research.
Both thermal and shear flow systems are covered, while applications reviewed include aerodynamics and materials processing, geophysics, oceanography, atmospheric science and astrophysics.
Series: Advances in Fluid Mechanics, Vol 20
ISBN: 1-85312-515-6   1999   368pp £115.00/US$185.00

Calculation of Complex Turbulent Flows

Editor: **G.D. TZABIRAS**, *National Technical University of Athens, Greece*

A selection of invited chapters focusing on up-to-date developments in the application of Computational Fluid Dynamics (CFD) to compressible or incompressible flows dominated by turbulence effects. These may be applied to complex geometrical configurations or flow-fields in simpler geometries requiring higher-order turbulence modelling, or suitably modified low-order models, to calculate crucial parameters such as instabilities, transition, separation, accurate description of velocity and scalar fields, and local and total forces.
The book consists of nine chapters which cover DNS applications, advanced first- and second-order turbulence models, LES models, complex shear flows, turbomachinery applications, rotating blades, complex geometries, supersonic flows, and marine hydrodynamics.
Series: Advances in Fluid Mechanics
ISBN: 1-85312-645-4   2000   apx 270pp apx £80.00/US$135.00
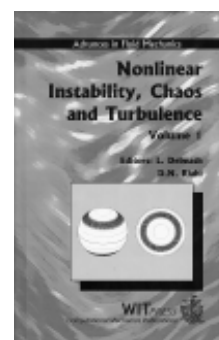
Time-Dependent Nonlinear Convection

Editor: **P.A. TYVAND**, *Agricultural University of Norway, Ås, Norway*

This title presents some basic topics within the area of time-dependent nonlinear convection. The first chapter gives an authoritative review of time-dependence related to instabilities in nonlinear Rayleigh-Bénard convection. Chapter 2 reviews the different convection cell patterns and focuses on their phase instabilities. Time-dependence in free-convection boundary layers and in porous media is discussed in Chapters 3 and 4. Chapter 5 is devoted to the transient layer formation caused by double-diffusive convection, while the final chapter discusses time-dependence in nonlinear convection driven by non-uniform surface tension at a free surface.
Series: Advances in Fluid Mechanics, Vol 19
ISBN: 1-85312-521-0   1998   240pp £73.00/US$117.00

Advances in Fluid Mechanics Series

Intra and Extracorporeal Cardiovascular Fluid Dynamics
Volume 1 – General Principles in Application

Editor: **P. VERDONCK**, *Hydraulics Laboratory, Institute of Biomedical Technology, University of Gent, Belgium*

Engineering science is presently contributing enormously to the improvement of quality of health and patient care, and physicians, clinical engineers and paramedics are increasingly dependent on high-tech apparatus for diagnosis, therapy or research. This technical revolution has encouraged the use of fluid dynamic principles for solving flow and fluid problems within the cardiovascular system, in extracorporeal circulation and artificial organs. Featuring a collection of expert reviews in lecture note format, **Intra and Extracorporeal Cardiovascular Fluid Dynamics: General Principles in Application** contains contributions from active members of international biomedical engineering organisations such as the IFMBE, the ISAO, the ESEM, the ESAO and the INFA. A comprehensive introduction for students, it also provides a state-of-the-art guide for investigators working in this fascinating and complex field.

Contents: Cardiac Mechanical Models; Analysis of Arterial Hemodynamics using the Principle of Wave Separation; Microvascular Networks; Extracorporeal Systems; Valvular Dynamics; Analytical Modelling of Vascular Prostheses Mechanics; Biomechanical Aspects of Intracoronary Stents; Cardiac Assist Devices.
Series: Advances in Fluid Mechanics, Vol 22
**ISBN: 1-85312-547-4 1998 272pp
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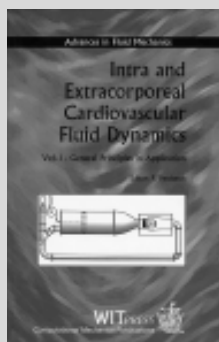
Intra and Extracorporeal Cardiovascular Fluid Dynamics
Volume 2 – Computational Fluid-Structure Interaction in the Cardiovascular System

Editors: **K. PERKTOLD**, *Institute of Mathematics, Technical University of Graz, Austria and* **P. VERDONCK**, *Hydraulics Laboratory, Institute of Biomedical Technology, University of Gent, Belgium*

How are pressure and flow determined in the cardiovascular system? What is the interaction between blood flow and the cardiac and vascular wall? What impact does the design of an artificial heart valve have on cardiovascular flow dynamics? How do stents influence flow-arterial dynamics?

The interaction of the various elements of the cardiovascular system is an important area of study. Written by a team of international contributors, this text is an accessible guide for all those who wish to understand cardiovascular dynamics. Special emphasis is placed on fluid-structure interaction with advanced computational tools.

Contents: Ventricular Mechanics During the Ejection Phase; Left Heart Fluid Mechanics; Wave Propagation and Left Ventricular Blood-Wall Interaction; Flow Investigation in Deformable Arteries; Flow in Stented Arteries; Introduction to the Physiology of the Circulation of Blood; Mass Transport in Large Arteries and Through the Artery Wall; Numerical and Analytical Models of Artificial Heart Valves; Finite Element Modeling of Blood Flow - Relevance to Atherosclerosis; Flow-Structure Interactions in Biomechanics.
Series: Advances in Fluid Mechanics, Vol 23
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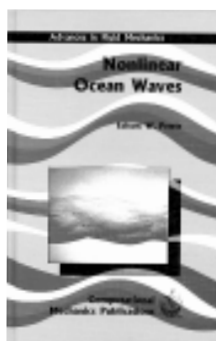
Dynamics of Atmospheric Flows
Atmospheric Transport and Diffusion Processes

Editors: **M.P. SINGH**, *University of Alabama in Huntsville, USA and* **S. RAMAN**, *North Carolina State University, USA*

Dynamics of Atmospheric Flows covers topics on atmospheric transport and diffusion processes with particular emphasis on the Atmospheric Boundary Layer (ABL). In dealing with a problem so complex as air pollution the cooperation of experts from many different disciplines is required and each of the contributors to this book was chosen with this in mind.
Contents: Unstable and Convective Boundary Layers; Turbulence and Dispersion in the Stable Atmospheric Boundary Layer - Sections A & B; Urban Air Pollution; Mesoscale Atmospheric Transport and Diffusion Processes; Leaky Containment Vessels of Air: A Lagrangian-Mean Approach to the Stratospheric Tracer Transport.
Series: Advances in Fluid Mechanics, Vol 18
**ISBN: 1-85312-427-3 1998 264pp
£88.00/US$135.00**

Nonlinear Ocean Waves

Editor: **W. PERRIE**, *Bedford Institute of Oceanography, Canada*

Ocean waves are generated and evolve in space and time, sometimes propagating over thousands of kilometres. Understanding these waves involves looking at the processes that drive them and determining their development including the energy removed from waves by wave breaking and white-capping, and nonlinear wave-wave interactions. In this study, the contributors consider:

- How observed waves grow and develop, maintaining an equilibrium with the wind, being driven by wind and also modifying the wind.
- How ideal potential waves grow and develop, as well as the spectra of wind-wave turbulence.
- The modelling of nonlinear wave-wave interactions, wind input and wave dissipation in shallow water and turning wind situations.

Series: Advances in Fluid Mechanics, Vol 17
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Advances in Fluid Mechanics Series

NEW

Nonlinear Instability Analysis

Volume II

Editor: L. DEBNATH, University of Central Florida, USA

A second review of recent important developments in this vibrant and dynamic field.
Contents: Models for Instability in Inviscid Flows Due to a Resonance Between Two Waves; Nonlinear Surface Waves and Chaos in Magnetohydrodynamics; Internal Wave-Shear Flow Resonance and Wave Breaking in Subsurface Layer; Wavelet Analysis of Turbulence Data - Coherent Structures Identification and Intermittency; Rhombic and Hexagonal Platform Weakly Nonlinear Stability Analysis - Theory and Applications; Coherent Vortex Motion.
Series: Advances in Fluid Mechanics
ISBN: 1-85312-842-2   2000   apx 300pp
apx £89.00/US$145.00

Nonlinear Instability Analysis

Editors: L. DEBNATH and S.R. CHOUDHURY, University of Central Florida, USA

There have been remarkable developments in the mathematical theory of nonlinear instability problems and their applications. This volume is a collection of eight research, research-expository and survey articles written by leading applied mathematicians and scientists who have made important contributions to this rapidly growing field. It brings together several important aspects of nonlinear instability phenomena which are likely to determine fruitful directions for future advanced study and research.
A coherent and comprehensive account with open questions and unsolved problems, the book provides an accessible introduction to modern mathematical techniques and research literature. It is an invaluable reference tool for all researchers in applied mathematics, physics and engineering disciplines.
Series: Advances in Fluid Mechanics, Vol 12
ISBN: 1-85312-428-1   1997   336pp
£108.00/US$169.00

Free Surface Flows with Viscosity

Editor: P.A. TYVAND, Agricultural University of Norway, Ås, Norway

In this volume, leading international experts review the current state of development of viscous phenomena.
Contents: Vortical Flow Generated by a Plate Rolling in a Free Surface; Mass Transport Induced by Surface Waves in a Viscous Rotating Fluid; An Accurate Model of Thin 2-D Fluid Flows with Inertia on Curved Surfaces; Viscous Surface Waves Generated by Moving Submerged Bodies; Damping of Interfacial Waves due to Viscosity and Surfactants; Effects of Seafloor Conditions on Water Wave Damping; Numerical Study of Contaminated Surface Deformation by a Vortex Pair; Unsteady Simulation of Viscous Thin-Layer Flows.
Series: Advances in Fluid Mechanics, Vol 16
ISBN: 1-85312-295-5   1997   256pp
£84.00/US$130.00
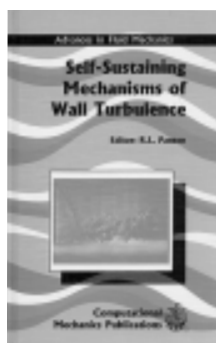
Self-Sustaining Mechanisms of Wall Turbulence

Editor: R.L. PANTON, University of Texas, Austin, USA

"…the quality [of the papers] is uniformly high."
AIAA JOURNAL

Why is wall turbulence self-sustaining? In this book well-regarded researchers not only discuss what they know and believe, but also speculate on ideas that still require numerical and experimental testing and verification.
An initial brief history of boundary layer structure research is followed by chapters on experimental information and specific topics within the subject. There are then sections on computational aspects such as low-order dynamical models and direct numerical simulations. Highlighting areas for possible future investigation, this is also a useful tutorial for the researcher.
Series: Advances in Fluid Mechanics, Vol 15
ISBN: 1-85312-453-2   1997   440pp
£84.00/US$134.00

Laminar and Turbulent Boundary Layers

Editor: M. RAHMAN, Technical University of Nova Scotia, Canada

Written by leading experts in the field, the emphasis of this volume is on laminar and turbulent boundary layers as applied to the physical problems of fluid mechanics.
Contents: Some Aspects of Perturbation Solutions Arising in 2-D Laminar Boundary Layers; Weak Discontinuities and Rays in Hyperbolic Systems – With Applications; Boundary Layer Flow Along a Circular Cylinder; On Developing Laminar Herschel-Bulkley Fluid Flow; Wave Impact on a Square Block – A Numerical Study; Entry Length and Flow Development in Tubes of Rectangular and Elliptic Cross Sections.
Series: Advances in Fluid Mechanics, Vol 14
ISBN: 1-85312-294-7   1997   192pp
£64.00/US$99.00

Fluid Transport in Porous Media

Editor: J.P. DU PLESSIS, University of Stellenbosch, South Africa

"…a high quality book for those who are theoretically inclined."
DRYING TECHNOLOGY

This book is devoted to advances made in some key areas of mathematical modelling involving the application of fluid mechanics to fluid transport and electric conduction in porous media.
Contents: Volume Averaging of Transport Equations; Pore-Scale Modelling of Interstitial Transport Phenomena; Recent Advances in Theories of Two-Phase Flow in Porous Media; Flow in Rotating Porous Media; Shock Waves in Porous Media; Computational Methods for Porous-Media Flows.
Series: Advances in Fluid Mechanics, Vol 13
ISBN: 1-85312-429-X   1997   320pp
£98.00/US$147.00

Advances in Fluid Mechanics Series

Flows at Large Reynolds Numbers

*Editor: **H. SCHMITT**, Deutsche Forschungsanstalt für Luft- und Raumfahrt (DLR), Göttingen, Germany*

Many types of flow, such as those around aircraft, ships, turbines and re-entry space vehicles, occur at large Reynolds numbers. Written by leading experts in the field, this book describes the methods used for the calculation of such flows including inviscid flow methods, boundary-layer methods, viscous-inviscid interaction methods, and Navier-Stokes equation methods.

Reviewing recent advances and comparing numerical results with experimental data, where available, **Flows at Large Reynolds Numbers** is essential reading for all scientists and engineers who need to be aware of the applications of numerical methods in this field.
Series: Advances in Fluid Mechanics, Vol 11
ISBN: 1-85312-383-8   1997   424pp
£118.00/US$188.00

Advances in Fluid Mechanics

*Editors: **M. RAHMAN**, Technical University of Nova Scotia, Canada and **C.A. BREBBIA**, Wessex Institute of Technology, UK*

The proceedings of the First International Conference on Advances in Fluid Mechanics.
Partial Contents: Inverse Fluid Mechanics Problems; Environmental Fluid Mechanics; Nonlinear Ocean Waves; Air-Sea Coupling Dynamics; Acoustics; Visualization; Bio-Fluid Mechanics; Aerodynamics.
Series: Advances in Fluid Mechanics, Vol 9
ISBN: 1-85312-452-4   1996   400pp
£145.00/US$217.00

Potential Flow of Fluids

*Editor: **M. RAHMAN**, Technical University of Nova Scotia, Canada*

A compilation of papers from leading authorities covering advanced topics in the potential flow of fluids.
Partial Contents: Reflection and Transmission of Solitary Waves on a Two-Layer Fluid over a Small Step; Some Recent Advances on Wave Effects on Large Offshore Structures; Prediction of Wave Breaking Processes at the Coastline; Wave Breaking Simulation.
Series: Advances in Fluid Mechanics, Vol 6
ISBN: 1-85312-356-0; 1-56252-279-5
(US, Canada, Mexico)   1995   264pp
£79.00/US$121.00

Gravity Waves in Water of Finite Depth

*Editor: **J.N. HUNT**, University of Reading, UK*

"…a first-rate starting place for those who wish to review the literature."
COASTAL RESEARCH
"...a must for research libraries interested in the general area of wave propagation in non-uniform media."
APPLIED MECHANICS REVIEW

In this book linear and nonlinear theories of wave modification are considered. There are chapters focusing on linear wave scattering, nonlinear dispersive long waves and parabolic modelling, the interaction of waves with tidal and other currents, the trapping of wave energy in the vicinity of particular topographical features, and the mechanisms by which waves change the bed profile through sediment transport. These will be of particular value to both coastal engineers and to those involved in the study of nearshore wave climate.
Series: Advances in Fluid Mechanics, Vol 10
ISBN: 1-85312-351-X   1997   336pp
£98.00/US$147.00

Mathematical Techniques for Water Waves

*Editor: **B.N. MANDAL**, Indian Statistical Institute, Calcutta, India*

The mathematical techniques used to handle various water wave problems are varied and fascinating. Highlighting a number of these, this book will be of interest to environmentalists as well as marine and coastal engineers.
Contents: Complementary Methods for Scattering by Thin Barriers; The Use of Multipoles in Channel Problems; Analytical Dynamics of Wave-Body Interactions; The Use of Green's Theorem in Water Wave Problems; Interaction of Water Waves with Thin Plates; A Survey on Two Mathematical Methods Used in Scattering of Surface Water Waves; On a Singular Integral Equation and its Use to Some Barrier Problems; Hydrodynamic Loading on an Elliptic Cylinder in Waves; On Fourth-Order Nonlinear Evolution Equations in Water Wave Theory; Propagation of Solitary Waves in a Binary Fluid.
Series: Advances in Fluid Mechanics, Vol 8
ISBN: 1-85312-413-3   1997   368pp
£108.00/US$168.00

Sedimentation of Small Particles in a Viscous Fluid

*Editor: **E.M. TORY**, Mount Allison University, Sackville, Canada*

The emphasis in this book is on the sedimentation of particles which are small enough for inertial and unsteady effects to be neglected, but large enough to make Brownian motion neglible.
Contents: Kynch Theory of Sedimentation; Phenomenological Theory of Sedimentation; Some Basic Principles in Interaction Calculations; Motion of a Rigid Particle in Stokes Flow; Velocities of Sedimenting Particles in Suspension; The Stochastics of Sedimentation; Theoretical and Experimental Evidence for a Markov Model for Sedimentation.
Series: Advances in Fluid Mechanics, Vol 7
ISBN: 1-85312-357-9; 1-56252-280-9
(US, Canada, Mexico)   1996   304pp
£88.00/US$135.00
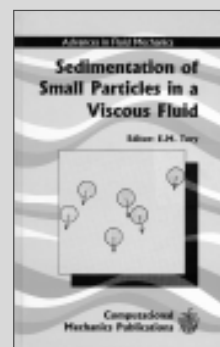
Fluid Structure Interaction in Offshore Engineering

*Editor: **S.K. CHAKRABARTI**, Chicago Bridge and Iron Technical Services Company, Chicago, USA*

A practical study of fluid structure interaction which contains contributions from renowned experts.
Contents: Nonlinear Laboratory Waves; Ship Capsize in Breaking Waves; Nonlinear Dynamics and Instability of SPM Tankers; Nonlinear Frequency Domain Analysis; Time Domain Analysis in Multi-Directional Seas; Large Based Structures near the Ocean Floor.
Series: Advances in Fluid Mechanics, Vol 1
ISBN: 1-85312-280-7; 1-56252-204-3
(US, Canada, Mexico)   1994   256pp
£76.00/US$117.00

Advances in Fluid Mechanics Series

Advances in Marine Hydrodynamics

*Editor: **M. OHKUSU**, Kyushu University, Fukuoka, Japan*

Placing particular emphasis on theoretical methods and their numerical implementation, this book describes recent advances achieved in marine hydrodynamics. Each chapter introduces background ideas and concepts and reviews research.
Contents: Ship Resistance and Flow Computations; Hydrodynamics of Ships in Waves; Hydrodynamics of High Speed Vehicles; Computation of Wave Ship Interaction; Cavitation; Theory and Numerical Methods for the Hydrodynamic Analysis of Marine Propulsors; Water Impact Problems in Ship Hydrodynamics.
Series: Advances in Fluid Mechanics, Vol 5
ISBN: 1-85312-287-4; 1-56252-211-6 (US, Canada, Mexico) 1996 384pp £112.00/US$170.00

Boundary Element Applications in Fluid Mechanics

*Editor: **H. POWER**, Wessex Institute of Technology, UK*

A compilation of Boundary Element Method developments which have been very successful in dealing with complex fluid problems.
Contents: Effect of Sharp Corners on Potential Fluid Flows past Blunt Bodies; Boundary Integral Methods for Rising, Bursting and Collapsing Bubbles; Boundary Element Approach to Laplacian Moving Boundary Problems; Recent Advances in the BEM Modelling of Nonlinear Water Waves; Transonic Field-Boundary Element Computations; Integral Formulations of a Diffusive-Convective Transport Equation; Stokes Flow in the Presence of Interfaces; Simulation of Viscous Sintering; Low Reynolds Number Particulate Flows; CDL-IEM for the Solution of the 2-D Navier-Stokes Equations at Small Reynolds Number: Via Singular Perturbation Technique; Applications of Boundary Element Methods in Non-Newtonian Fluid Mechanics.
Series: Advances in Fluid Mechanics, Vol 4
ISBN: 1-85312-288-2; 1-56252-212-4 (US,Canada,Mexico) 1995 376pp £108.00/US$167.00

Bio-Fluid Mechanics

*Editor: **H. POWER**, Wessex Institute of Technology, UK*

Contains details of recent developments in the area.
Contents: Orifice Flow in Stenotic and Regurgitant Valve Lesions: Modelling and Computer Simulations; A Three-Dimensional Simulation of Intraventricular Fluid Dynamics: Examination of Left Ventricular Early Systolic Function; Numerical Modelling of Blood Flow in Compliant Arteries and Arterial Bifurcations; Numerical Simulation of Arterial Haemodynamics; A Numerical Heart and Circulation Model to Simulate Haemodynamics for Rate-Responsive Pacing; Evaluation of Haemodialysis Systems using Computer Simulation; Folding Motifs, Kinetics and Function in the Proximal Convoluted Tubule; Coupled Behaviour of Lung Respirations: Computational Respiratory Mechanics Approach; Micropolar Fluid Model for the Brain Fluid Dynamics.
Series: Advances in Fluid Mechanics, Vol 3
ISBN: 1-85312-286-6; 1-56252-210-8 (US, Canada, Mexico) 1995 336pp £107.00/US$164.00
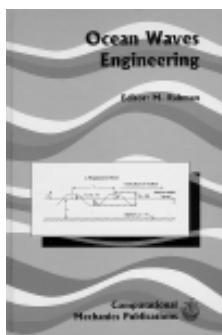
Ocean Waves Engineering

*Editor: **M. RAHMAN**, Technical University of Nova Scotia, Canada*

This book presents advances in the theoretical and numerical aspects of problems arising in ocean waves engineering and links theoretical developments with practical applications.
Partial Contents: Low-Frequency Asymptotics of Hydrodynamic Forces on Fixed and Floating Structures; Second-Order Sum-Frequency Wave Loads and Response of Tension-Leg Platform; Some Radiation and Diffraction Problems in the Linearized Theory of Water Waves; Painleve Analysis.
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Water Wave Scattering by Barriers

B.N. MANDAL, Indian Statistical Institute, Calcutta, India and A. CHAKRABARTI, Indian Institute of Science, Bangalore, India

An up-to-date account of mathematical developments in the study of water wave scattering problems involving barriers of various geometrical configurations. The authors explore mathematical tools and techniques, both exact and approximate, required for solving problems involving vertical, nearly vertical and curved barriers as well as their generalisations. They prove that while the exact methods have their own limitations, some of the approximate methods, such as perturbation and Galerkin techniques produce sufficiently accurate numerical results in a number of situations. Unique in being solely related to the mathematical study of water wave scattering problems involving barriers present in deep as well as finite depth water, this book will be suitable for applied mathematicians and engineers engaged in research in ocean-related industries.
ISBN: 1-85312-623-3 2000 408pp £122.00/US$197.00

Flow Instability

D.N. RIAHI, University of Illinois, USA

This book presents older classical theories of hydrodynamic stability as well as new developments in nonlinear stability, achieved mostly in the last three decades. It is designed for use by researchers and graduate students, and the author follows a fluid mechanics and applied mathematics approach. Emphasis is placed on realistic results relevant to a wide range of applications in areas such as aeronautic, chemical, civil, mechanical, environmental and oceanic engineering, geophysics, astrophysics, atmospheric sciences, naval research, oceanography and applied mathematics.
The text is divided into two main parts dealing with linear instability and nonlinear instability, while emphasis is placed on the link between theory and experimental and numerical results. Each of the five chapters included ends with problems which supplement the main text and which may be used as exercises by readers.
Contents: Fundamentals of Instability Cases and Approaches; Further Types of Instability and Applications; Nonlinear Stability; Further Topics on Nonlinear Stability; Appendices.
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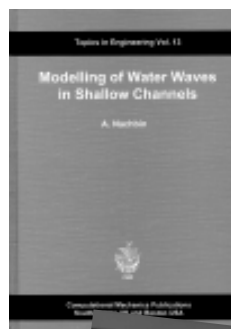
Modelling of Water Waves in Shallow Channels

A. NACHBIN, New Jersey Institute of Technology, Center for Applied Mathematics and Statistics, USA

An invaluable guide to the numerical study of a wide range of linear water wave problems.
Partial Contents: An Introduction to the Theory; Finite Difference Method for Channels with a Flat Bottom; Boundary Integral Equation Method (BIEM) for the Linear Water Wave Problem; Reflection and Transmission in Shallow Channels with Rapidly Varying Bottoms.
Series: Topics in Engineering, Vol 13
**ISBN: 1-85312-135-5; 1-56252-062-8 (US, Canada, Mexico)   1993   160pp
£62.00/US$95.00**
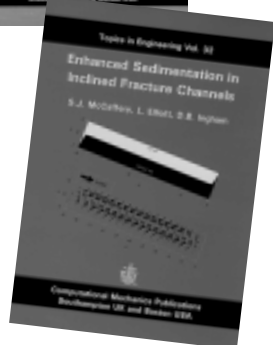
Enhanced Sedimentation in Inclined Fracture Channels

*Editors: **S.J. McCAFFERY**, **L. ELLIOTT** and **D.B. INGHAM**, The University of Leeds, UK*

In general, the simplest means of inducing sedimentation is via gravity settling. However, this mechanism is very slow and nowadays many industrial processes favour the more efficient separation devices with inclined rather than vertical surfaces.
This book is dedicated to the Boycott Effect, the phenomenon of enhanced sedimentation in inclined channels. Numerical results are presented for the case of sedimentation across the width of an inclined channel with infinite height and length. Analytical solutions are also illustrated in order to demonstrate the validity of these numerical procedures. The case of sedimentation in a channel of finite dimensions is also considered.
Contents: The Governing Equations and Background Information; Solution of the One-Dimensional Concentration Equation; Solution of the One-Dimensional Momentum Equation; One-Dimensional Effects of Near-Wall Voidage; Method of Solution for the Two-Dimensional Equations; Results and Discussion for the Two-Dimensional Equations.
Series: Topics in Engineering, Vol 32
**ISBN: 1-85312-546-6   1997
Book on CD-ROM   £78.00/US$125.00**
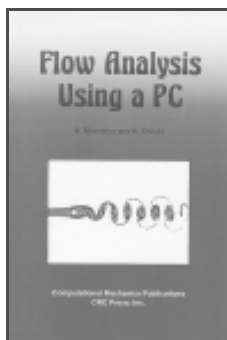
Flow Analysis Using a PC

H. NINOMIYA, Fukuoka University, Japan and K. ONISHI, Science University of Tokyo, Japan

A short introductory course on simple numerical modelling of fluid flows, using the elementary finite element method. Fundamental and important flows have been carefully selected and formulated and it is assumed that readers will be using comparatively low-cost personal computers or workstations. BASIC programs are provided on an accompanying diskette.
**ISBN: 1-85312-144-4; 1-56252-077-6 (US, Canada, Mexico)   1991   212pp/Diskette
£54.00/US$83.00**

Titles of Related Interest

Bioengineering Section...p7

Boundary Integral Methods in Fluid Mechanics...p12

Advances in Fracture Mechanics Series

Computational Fracture Mechanics in Concrete Technology

*Editors: **A. CARPINTERI**, Politecnico di Torino, Italy and **M.H. ALIABADI**, Queen Mary College, University of London, UK*

This book describes the most recent computational approaches, based on fracture mechanics, for the structural analysis of concrete and reinforced concrete. Both smeared and localized numerical fracture models which simulate damage zones and discrete cracks developing in loaded concrete members are considered. Particular loading conditions are also discussed where the use of fracture mechanics is appropriate.
Written by prominent researchers in the field, **Computational Fracture Mechanics in Concrete Technology** covers the following topics: Materials Engineering of Cement-Based Composites using Lattice Type Models; Computational Damage Mechanics; Continuum Damage Applied to Concrete Modelling; Integral Equation Method for Modelling Cracking Concrete; A Discrete Crack Numerical Model; Boundary Element Method for Analysis of Cracking in Plain and Reinforced Concrete; Creep Crack Growth in Concrete Structures – Cohesive Crack Model in Mode I and Mixed-Mode Loading Conditions.
Series: Advances in Fracture Mechanics, Vol 3
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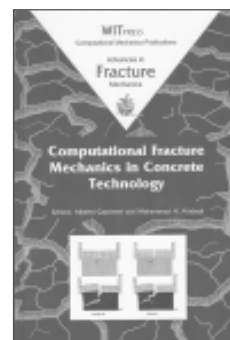
Advances in Fracture Mechanics Series

Fracture of Rock

Editor: M.H. ALIABADI, Queen Mary College, University of London, UK

Bringing together the latest research on fracture of rocks, this state-of-the-art volume covers a wide range of subjects, including hydraulic fracturing, blasting and fragmentation, transport problems and creep.
All of the chapters have been contributed by leading scientists in the field and focus on modelling and analysis techniques. The following topics are covered: Boundary Element Analysis for Rock Fracture; Numerical Models of Shear Crack Propagation using the Displacement Discontinuity Method; The Displacement Discontinuity Method for the Analysis of Rock Structures – a Fracture Mechanics Approach; Computationally Efficient Models for the Growth of Large Fracture Systems; Fracture, Fragmentation and Rock Blasting Models in the Combined Finite-Discrete Element Method; Rock Fragmentation and Optimisation of Drilling Tools; Modelling of Microcrack Induced Damage and Poroelasticity in Brittle Rocks; Modelling of Hydraulic Fracturing of Porous Materials; A General Analysis of Transports in Fracture Networks; Transport of Colloids in Saturated Fractures; Creep Deformation and Fracture in Rock Salt; Application of the Theory of Plasticity to Analysis of Bearing Capacity Problems in Fissured Materials.
Series: Advances in Fracture Mechanics, Vol 5
**ISBN: 1-85312-542-3   1999   440pp
£155.00/US$248.00**

NEW

Nonlinear Fracture and Damage Mechanics

Editor: M.H. ALIABADI, Queen Mary College, University of London, UK

Incorporating the latest research in the increasingly popular area of nonlinear and damage mechanics, this book contains several chapters describing state-of-the-art developments in computational methods as applied to metallic and non-metallic materials.
Contents: Constitutive-Microdamage Description of Ductile Dynamic Fracture; BEM Modelling and Experimental Measurements for Nonlinear Crack Growth; A New Nonlinear Analysis Approach Based on Damage Mechanics and BEM; Size Effects in Fracture of Quasi-Brittle Materials; A Complete Gurson Model; Closed Form Solutions for Stress Intensity Factors in a MSD Stiffened Panel with a Review of Different Approaches to the Problem; Microstructural Effects in Stress Concentration and Fracture Problems in Rock Mechanics.
Series: Advances in Fracture Mechanics, Vol 4
**ISBN: 1-85312-508-3   2000   apx 300pp
apx £94.00/US$150.00**

NEW

Analysis of Cracks in Solids

A.M. KHLUDNEV and V.A. KOVTUNENKO, Russian Academy of Sciences, Russia

This book provides a fresh outlook on crack problems, displaying new methods of studying these and proposing new models for cracks in elastic and nonelastic bodies satisfying physically suitable nonpenetration conditions between crack faces. Two- and three-dimensional bodies, plates and shells with cracks are considered. Properties of solutions such as existence of solutions, regularity up to the crack faces, and convergence of solutions as parameters of a system are varying are established, while different constitutive laws such as elastic, thermoelastic and elastoplastic are also analysed.
Designed for use by postgraduate students, scientists and engineers, this book covers the following topics: Cracks in Plates and Shells; Cracks in Complicated Plates; Variation of Cracks in Solids; and Cracks in Elastoplastic Bodies.
Series: Advances in Fracture Mechanics, Vol 6
**ISBN: 1-85312-625-X   2000   408pp
£124.00/US$195.00**

Stress Intensity Factors and Weight Functions

T. FETT, Research Center, Karlsruhe, Germany and D. MUNZ, University of Karlsruhe, Germany

"…if someone has a crack problem at hand and wishes to know if a solution exists for that problem, **Stress Intensity Factors and Weight Functions** will prove to be a valuable resource."
APPLIED MECHANICS REVIEWS

In this book the authors describe methods for the calculation of weight functions. In the first part they discuss the accuracy and convergence behaviour of methods allowing the determination of stress intensity factors and weight functions for one- and two-dimensional cracks. They then move on to provide solutions for cracks subjected to mode-I and mode-II loading.
Series: Advances in Fracture Mechanics, Vol 1
**ISBN: 1-85312-497-4   1997   408pp
£110.00/US$169.00**

NEW

Thermomechanical Fatigue and Fracture

Editor: M.H. ALIABADI, Queen Mary College, University of London, UK

This book brings together contributions from leading researchers in the field of computational methods and experimental measurements to provide a comprehensive description of current state-of-the-art developments in thermomechanical fatigue and fracture.
Series: Advances in Fracture Mechanics
**ISBN: 1-85312-549-0   2000   apx 250pp
apx £78.00/US$125.00**
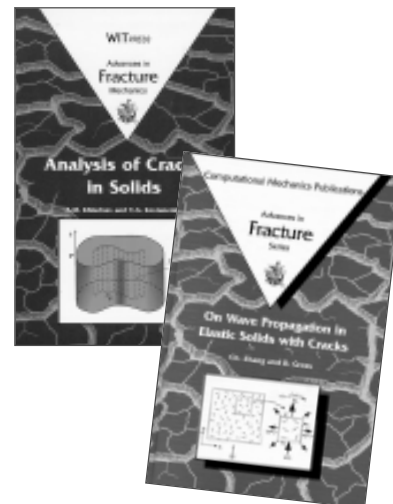
On Wave Propagation in Elastic Solids with Cracks

C. ZHANG, Hochschule für Technik, Zittau, Germany and D. GROSS, Institut für Mechanik, Darmstadt, Germany

"...should be on the shelves of any researcher interested in numerical crack scattering computations in either the time or frequency domain."
APPLIED MECHANICS REVIEWS

Containing reports on wave propagation in elastic solids with cracks, this book looks at problems and treatments, and features numerical examples to show the accuracy and efficiency of the methods employed. Topics covered include: Boundary Integral Methods; Elastodynamic Stress Intensity Factors; Time-Harmonic Wave Propagation; Anti-Plane Interface Cracks; Wave Attenuation and Dispersion; and Damage Mechanics.
Series: Advances in Fracture Mechanics, Vol 2
**ISBN: 1-85312-535-0   1997   272pp
£78.00/US$125.00**

NEW

Linear Elastic Fracture Mechanics for Engineers
Theory and Applications

L.P. POOK, *University College, London*

This book fulfills the need for a short, modern introductory text on linear elastic fracture mechanics and its engineering applications. Suitable for use by engineering undergraduates and other newcomers to the subject, it:
- Explains the main ideas underlying present day linear elastic fracture mechanics and how these have been developed.
- Shows how the ideas can be used to carry out calculations answering the question 'Does this crack matter?' from the viewpoint of an engineering designer.
- Provides an understanding of the basis of standard methods and software employed to carry out calculations.
- Includes additional, more advanced material, where this will increase understanding of the sometimes formidable mathematics involved, and of the various simplifications and approximations used in practical applications.

The author includes all the material central to an undergraduate introductory course and ends each chapter with an overview of the material covered to aid accessibility. Familiarity with the mechanical properties of metallic materials, and with the linear elastic stress analysis of uncracked bodies is assumed.

ISBN: 1-85312-703-5 2000 176pp
£58.00/US$95.00

> Lecturers - Price reductions are available when you purchase multiple copies of this text. Please contact the Marketing Department at WIT Press for details.

Damage and Fracture Mechanics

Editors: C.A. BREBBIA, *Wessex Institute of Technology, UK and A. CARPINTERI*, *Politecnico di Torino, Italy*

Contains most of the papers presented at the Fifth International Conference on Computer Aided Assessment and Control of Localized Damage and Fracture Mechanics.
The book features details of recent research in the field, with contributions from many leading international scientists. Papers are divided under the following section headings: Fracture Mechanics and Fracture Criteria; Damage Mechanics; Composite Materials; Crack Propagation and Control; Fatigue; Creep and High-Temperature Problems; Microstructural and Micromechanical Modelling; Environmental Effects; Residual Stresses; Experimental Methods.
Series: Structures and Materials, Vol 1
ISBN: 1-85312-583-0 1998 688pp
£198.00/US$325.00

NEW

Linear and Nonlinear Crack Growth using Boundary Elements

A. CISILINO, *Universidad Nacional de Mar del Plata, Argentina*

This book brings together descriptions of three-dimensional boundary element methods for the analysis of fatigue crack problems in linear and nonlinear fracture mechanics. In order to overcome the mathematical degeneration associated with the solitary use of the displacement boundary integral equation for cracked bodies, the methods depicted rely on formulations based on two independent boundary integral equations: the dual boundary element method. The author demonstrates the effective implementation of the methods, and devotes special attention to the description of accurate algorithms for the evaluation of singular and near-singular integrals in the dual equations.
Contents: Introduction; Solid and Fracture Mechanics Fundamentals; The Dual Boundary Element Method for Three-Dimensional Cracked Bodies; Three-Dimensional DBEM Analysis for Fatigue Crack Growth; A BEM for Three-Dimensional Elastoplastic Problems; The Elastoplastic Dual Boundary Element Method in Three Dimensions; BEM Analysis of Fracture Problems using the Energy Domain Integral; Full-Penetration Welded Joint.
Series: Topics in Engineering, Vol 36
ISBN: 1-85312-700-0 2000 208pp
£79.00/US$126.00

Crack Growth in Concrete using Boundary Elements

A. LATIF SALEH, *Wessex Institute of Technology, UK*

"...fills an important need and documents the success of the BEM in accommodating an important application."
APPLIED MECHANICS REVIEWS

This book presents the simulation of crack growth in concrete in a straightforward manner using the fictitious crack model in conjunction with the dual boundary element method (DBEM). The DBEM is based on the application of the displacement boundary integral equation on one crack surface and of the traction boundary integral equation on the other. By using the DBEM, the analysis of crack problems can be performed effectively in a single region formulation, and for every crack extension increment, no remeshing is required.
Series: Topics in Engineering, Vol 30
ISBN: 1-85312-476-1 1997 192pp
£67.00/US$99.00

NEW

A Dual Boundary Element Formulation for Three-Dimensional Fracture Analysis

A. WILDE, *Wessex Institute of Technology, UK*

This volume presents the dual boundary element formulation which uses continuous elements in three dimensions, and applies it to the analysis of geomechanical fracture problems and fatigue crack growth. The method overcomes the mathematical degeneration associated with the solitary use of the displacement boundary integral equation for cracked bodies by introducing an additional independent boundary integral equation on one of the crack surfaces. Effective implementation is achieved through the use of accurate algorithms for the singular and near-singular integrals in the dual equations.
Contents: Introduction; Basic Elasticity and Fracture Mechanics; The Boundary Element Method; The Three-Dimensional Dual Boundary Element Method; Enriched Elements for the Evaluation of the Traction BIE; The Dual Boundary Element Method for Three-Dimensional Crack Analysis; Application of the DBEM to Crack Analysis in Geomechanics; Application of the DBEM to Three-Dimensional Crack Growth Analysis; Conclusions; Bibliography; Appendices.
Series: Topics in Engineering, Vol 37
ISBN: 1-85312-679-9 2000 244pp
£84.00/US$135.00
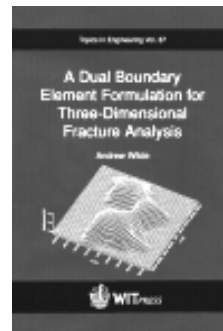
Dynamic Fracture Mechanics
Displacement Discontinuity Method

P.H. WEN, Wessex Institute of Technology, UK

"…an excellent reference book for researchers in the field of elastostatic and elastodynamic fracture mechanics. It would be useful for individual researchers as well as technical libraries."
APPLIED MECHANICS REVIEWS

Series: Topics in Engineering, Vol 29
ISBN: 1-85312-446-X; 1-56252-356-2
(US, Canada, Mexico) 1996 204pp
£69.00/US$104.00

NEW

Damage and Fracture Mechanics VI

Editors: C.A. BREBBIA, Wessex Institute of Technology, UK and A.P.S. SELVADURAI, McGill University, Canada

This book contains papers presented at the Sixth International Conference on Computer Aided Assessment and Control - Damage and Fracture Mechanics 2000. The contributions are the work of scientists and engineers from different disciplines involved in the study and assessment of localised damage, and address fracture, fatigue and safe design with emphasis on the application of advanced techniques. Both critical reviews of existing ideas and explorations of new areas of research across a wide range of applications including static and dynamic loadings, and probabilistic and deterministic analysis are included.
Topics covered include Fracture Mechanics and Fracture Criteria; Composite Materials; Dynamic Fracture; Fatigue; Design Considerations and Industrial Applications; Failure Analysis; Metallic and Non-Metallic Materials; Plasticity and Viscoplasticity; Finite Elements, Boundary Elements and other Advanced Numerical Techniques.
Series: Structures and Materials
ISBN: 1-85312-812-0   2000   apx 600pp apx £180.00/US$289.00

Thermomechanical Crack Growth using Boundary Elements

N.N.V. PRASAD, CADS Software, India

Thermal and mechanical fatigue problems are encountered in many engineering components, such as pressure vessels, high-temperature engines and interfaces in computer technology. This book describes modelling of thermal fatigue using the Dual Boundary Element Method. In this method both thermal and elasticity equations are written as regular and hypersingular equations, then applied on the crack surfaces. For thermal stress intensity factors a new one-point displacement extrapolation technique is described.
Partial Contents: Thermoelasticity and Fracture Mechanics; Boundary Integral Equations; Dual Boundary Element Method Applied to Steady State Thermoelasticity; Dual Boundary Element Method; Effect of Thermal Singularities on Stress Intensity Factors; Thermo-Mechanical Fatigue Crack Growth.
Series: Topics in Engineering, Vol 34
ISBN: 1-85312-541-5   1998   216pp £74.00/US$115.00

NEW

Fracture Mechanics of Piezoelectric Materials

Q.-H. QIN, University of Sydney, Australia

Written with the aim of encouraging further development of the fracture mechanics of coupled thermo-electro-elastic problems, this monograph examines crack problems in piezoelectric materials. Emphasis is placed on fundamental concepts, the development of mathematical models and their computational solutions. The methods are described and derived in a way which makes them more accessible to postgraduate students, research scientists and engineers.
Partial Contents: Basic Equations of Linear Piezoelectric Materials; Stroh's Formalism; Lekhnitskii Procedure; Dislocation Density Function; Green's Function of Solution; Singular Integral Equations; Interface Crack; The Penny-Shaped Crack; Solution of Bimaterial Problem; Crack in Half-Plane; Crack Kinking; Fracture Criteria for Piezoelectric Materials; Cracks by Boundary Element Method; Fracture Experiments in Piezoelectric Materials.
ISBN: 1-85312-856-2   2000   apx 280pp apx £94.00/US$149.00
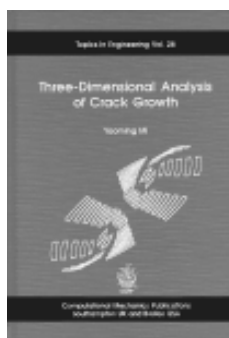
Three-Dimensional Analysis of Crack Growth

Y. MI, Department of Aeronautics, Imperial College, London, UK

This book presents an efficient 3-D crack growth method using boundary elements to allow for the realistic analysis of crack growth in engineering applications.
Partial Contents: Basic Elasticity and Fracture Mechanics; The Dual Boundary Element Method in Three Dimensions; Singular and Near-Singular Integrals; Application of DBEM to Crack Problems; The Numerical Simulation of Crack Growth; Application of an Aluminium Alloy Bridge Girder; Final Conclusions and Future Research.
Series: Topics in Engineering, Vol 28
ISBN: 1-85312-445-1; 1-56252-355-4 (US, Canada, Mexico)   1996   204pp £79.00/US$128.00

NEW

Thermoelastic Fracture Mechanics using Boundary Elements

D.N. dell'ERBA, Universidad Nacional de Mar del Plata, Argentina

This book describes the formulation and implementation of the dual boundary element method (DBEM) as applied to 3-D fracture mechanics in thermoelasticity. J-integral implementation and crack growth simulation are included.
- Achieves the mixed-mode SIF through a decomposition technique.
- Features methods that allow easy 3-D crack growth simulation under thermomechanical loads.
- Designed for use by postgraduate students and researchers in academia and industry.
Series: Topics in Engineering
ISBN: 1-85312-849-X   2000   apx 200pp apx £68.00/US$109.00

Localized Damage IV
Computer-Aided Assessment and Control

Editors: H. NISITANI, Kyushu Sangyo University, Japan, M.H. ALIABADI, Wessex Institute of Technology, UK, S-I. NISHIDA, Saga University, Japan and D.J CARTWRIGHT, Bucknell University, USA

The proceedings of the Fourth International Conference on Localized Damage. The papers presented are divided under the following headings: Invited Papers; Fatigue; Stress and Failure Analysis; Damage Mechanics; Composite Materials; Microstructural and Micromechanical Modelling; Nonlinear Behaviour; Environmental Effects; Computational Methods; Non-Metallic Materials; Flaw Identification and Non-Destructive Materials; Design Considerations and Industrial Applications; Crack Propagation and Control.
ISBN: 1-85312-397-8   1996   965pp £238.00/US$357.00

Dynamic Fracture Mechanics

Editor: M.H. ALIABADI, Wessex Institute of Technology, UK

This book presents a review of dynamic fracture mechanics with particular emphasis on computational methods. It consists of several chapters written by leading researchers in the field and covers finite elements, finite volume and boundary element methods. The aim is to provide fundamental concepts of advances in computational methods, and outline the algorithms required to implement the techniques in practical engineering analysis.
Series: Computational Engineering
ISBN: 1-85312-343-9; 1-56252-267-1
(US, Canada, Mexico)   1995   328pp
£98.00/US$150.00

Early Fatigue Crack Growth at Welds

C.C. MONAHAN, University College, London, UK

"...a good reference for engineers and researchers working in the field of fracture mechanics and non-destructive testing."

CSME

Welded components are inspected periodically to ensure safety in operation, but cost-effective inspection planning demands that accurate non-destructive test (NDT) techniques be used to detect and size fatigue cracks, and reliable fracture mechanics models be used to predict their growth. This book contains research on monitoring and predicting early fatigue crack growth in welded steel joints.
Series: Topics in Engineering, Vol 26
ISBN: 1-85312-364-1; 1-56252-288-4
(US, Canada, Mexico)   1995   208pp
£89.00/US$139.00

Computational and Experimental Fracture Mechanics

Editor: H. NISITANI, Kyushu University, Japan

Features important contributions by Japanese researchers on approaches and results in fracture mechanics.
Partial Contents: Body Force Method and its Application; Boundary Element Method and its Applications to the Analyses of Dissimilar Materials and Interface Cracks; Fully Plastic Solutions of Three-Dimensional Cracks; Dynamic Crack Problems; Sizing Closed Cracks by Ultrasonics and Analysis.
Series: Topics in Engineering, Vol 16
ISBN: 1-85312-278-5; 1-56252-202-7
(US, Canada, Mexico)   1994   448pp
£108.00/US$166.00

Dual Boundary Element Analysis of Crack Growth

A. PORTELA, Wessex Institute of Technology, UK

In this book the author describes the Dual Boundary Element Method and its application to the analysis of fatigue crack-growth problems, in the context of the damage tolerance analysis with linear elastic fracture mechanics.
Series: Topics in Engineering, Vol 14
ISBN: 1-85312-187-8; 1-56252-116-0
(US, Canada, Mexico)   1993   192pp
£72.00/US$110.00

Advances in Boundary Element Methods in Fracture Mechanics

Editors: M.H. ALIABADI and C.A. BREBBIA, Wessex Institute of Technology, UK

Written by some of the leading researchers in the field, this book presents advances in applications of the BEM to crack problems. Topics covered include BEM computations of elastodynamic fields in bodies containing internal, near-surface and surface-breaking cracks, the BEM as a tool in the design of composite laminates, and special crack-tip elements for 3-D problems.
Series: Computational Engineering
ISBN: 1-85312-102-9; 0-94582-485-8
(US, Canada, Mexico)   1992   300pp
£99.00/US$152.00

Software

Database of Stress Intensity Factors

M.H. ALIABADI, Wessex Institute of Technology, UK

Making the important parameters of stress intensity factors available as a flexible commercial software package the **Database of Stress Intensity Factors** allows the user greater ease in locating the precise geometry of interest, and creates an accurate reading of K-factors at the press of a button. An invaluable tool for engineers and researchers working in the field of fracture mechanics, this time-saving device operates under Windows 3.X, NT or Windows 95.
ISBN: 1-85312-296-3; 1-56252-220-5
(US, Canada, Mexico)   1996
Set of Disks   £380.00/US$550.00

> *A demonstration disk for this product is available on request from the Marketing Department at WIT Press.*

Software

Crack Growth Analysis using Boundary Elements

A. PORTELA and M.H. ALIABADI, Wessex Institute of Technology, UK

This software utilizes recent developments in the BEM, removing the difficult and time consuming task of remeshing as the crack propagates and accurately evaluating the stress intensity factors for which the BEM is renowned. Using the established criterion for crack propagation, the software evaluates residual strength, as well as fatigue life calculations.
In addition three special modules which allow for the modelling of stiffeners and the analysis of thermoelastic and anisotropic crack growth problems are available. In order to run one or more of these, it is necessary to have a copy of the main **Crack Growth Analysis** software package.
ISBN: 1-85312-186-X Crack Growth Analysis Software (Ringbinder/Diskette/50 page manual/Boundary Elements book)   1992
£675.00/$1,036.00

Thermoelasticity Module

N.N.V. PRASAD and M.H. ALIABADI
ISBN: 1-85312-345-5; 1-56252-269-8
(US, Canada, Mexico)   £300.00/US$460.00

Anisotropy Module

P. SOLLERO and M.H. ALIABADI
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Computer Simulations in Compact Heat Exchangers

Editors: **B. SUNDÉN**, *Lund Institute of Technology, Sweden and* **M. FAGHRI**, *University of Rhode Island, USA*

"This book gives a summary of a great deal of the work performed for determining flows and heat transfer in channels often used in compact heat exchangers… Individuals involved in performing computational fluid dynamic analysis in forced flow situations should consider purchasing **Computer Simulations in Compact Heat Exchangers**. Research libraries should also add this to their collection."
APPLIED MECHANICS REVIEWS

During recent years, numerical methods for solving flow and heat transfer problems have been developed to such an extent that reliable predictions of the velocity and temperature fields, associated pressure drops and heat fluxes relevant to compact heat exchangers are possible in many cases. This book shows recent advances in computer simulations in compact heat exchangers as well as describing limitations and areas where further research and development are needed.
Contents: Introduction to Compact Heat Exchangers; Numerical Modelling and Analysis of Laminar Flow Heat Transfer in Non-Circular Compact Channels; Three-Dimensional Laminar Forced Convection Characteristics of Wavy Ducts with Trapezoidal Cross Section of Plate-Fin Heat Exchanger; Computer Simulation of Laminar and Turbulent Flow in Helicoidal Pipes; Turbulent Heat Transfer in a Corrugated Wall Channel; Calculation of Air-Side Heat Transfer in Compact Heat Exchangers under Condensing Conditions; Flow and Heat Transfer Predictions in Flow Passages of Air Preheaters: Assessment of Alternative Modelling Approaches; Experimental and Numerical Investigation of Heat Transfer Enhancement with Wing-Type Vortex Generators.
Series: Developments in Heat Transfer, Vol 1
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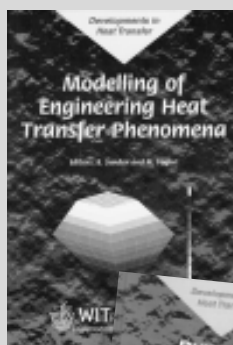
Modelling of Engineering Heat Transfer Phenomena

Editors: **B. SUNDÉN**, *Lund Institute of Technology, Sweden and* **M. FAGHRI**, *University of Rhode Island, USA*

This volume is concerned with methods and procedures for a variety of engineering heat transfer phenomena. It presents information on recent progress and the current status of principles, together with limitations and opportunities in modelling. Relevant results are also provided.
All contributions featured were invited and reviewed and are consequently of an extremely high standard. The topics discussed are as follows: Modelling and Optimization in Thermal Science – From Engineering to Predicting Organisation in Nature; Microscales of Natural Flows; Roles of CFD Simulation in Thermal Analysis of Microelectronic Equipment; Turbulence Modelling in Continuous Casting Processes; Computational Modelling of Nanosecond Pulsed Laser-Induced Melting and Vaporization; Finite Element Modelling of Coupled Convection-Conduction Phase Change; Modelling of Heat Transfer in Heat Pipes; Modelling of Inverse Heat Transfer; Application of the Boundary Element Method to the Solution of Heat Radiation Problems; Improved Lumped-Differential Formulations in Heat Transfer; Modelling Homogenous Bubble Nucleation in Liquids.
Series: Developments in Heat Transfer, Vol 2
ISBN: 1-85312-450-8 1998 384pp
£115.00/US$184.00

Heat Transfer in Gas Turbine Systems

Editors: **B. SUNDÉN**, *Lund Institute of Technology, Sweden and* **M. FAGHRI**, *University of Rhode Island, USA*

This unique title presents and reflects current active research on various heat transfer topics and related phenomena in gas turbine systems. It begins with a general introduction to various aspects of gas turbine heat transfer, before moving on to focus on several specific areas such as blade cooling, internal blade cooling, and blade leading edge problems. The role of recuperators is also discussed and numerical and experimental investigations are presented. Containing contributions from some of the most prominent specialists working in this field today, the book provides invaluable information for both graduate researchers and R&D engineers in industry and consultancy.
Series: Developments in Heat Transfer
ISBN: 1-85312-666-7 2000 apx 325pp
apx £99.00/US$162.00

Dynamic Behaviour of Heat Exchangers

W. ROETZEL, *Universität der Bundeswehr Hamburg, Germany and* **Y. XUAN**, *Nanjing University of Science and Technology, China*

This book deals exclusively with transient processes in heat exchangers – an area of growing interest in research and development, particularly as steady-state thermal calculation methods are now so highly developed.
The authors propose and describe suitable mathematical models and methods for the analytical and numerical treatment of transient processes in shell-and-tube, cross-flow, plate and other types of heat exchangers. Providing a firm basis for further research in this important and rapidly developing field **Dynamic Behaviour of Heat Exchangers**:-
- Gives sufficient information for research engineers, lecturers and students to write and apply programmes for the fast calculation of transient processes in heat exchangers.
- Presents examples explaining the influence of various design parameters on dynamic behaviour.
- Demonstrates how the knowledge and understanding of dynamic behaviour can be used to indirectly measure heat transfer coefficients and other parameters.
- Reviews new developments in heat exchanger modelling.
Series: Developments in Heat Transfer, Vol 3
ISBN: 1-85312-506-7 1998 400pp
£120.00/US$192.00

Developments in Heat Transfer Series

NEW

Modelling of Transport Phenomena in Crystal Growth

Editors: **J.S. SZMYD**, *University of Mining and Metallurgy, Krakow, Poland and* **K. SUZUKI**, *Kyoto University, Japan*

The large crystals of semiconducting and superconducting materials used for electronic and optical devices are usually grown from the melt by Czochralski or Bridgman method and their quality is significantly affected by the melt flow and related heat and mass transfer. Recent intensive research activities in this area covering crystal growth in microgravity, crystal growth of superconducting materials, crystal growth in high pressure, the commercial development of pullers that can produce crystals with large diameters etc. have substantially raised the expectation for numerous new practical applications.

A timely addition to the existing literature, this book represents the collective work of experts from five countries on the melt flow and related heat and mass transfer in the crystal growth system.
- Demonstrates how advanced mathematical, physical and numerical modelling can be used in the analysis of these processes.
- Details recent major developments in both fundamentals and applications.
- Provides valuable information both for researchers and students dealing with heat and mass transfer in crystal growth systems.

Series: Development in Heat Transfer
ISBN: 1-85312-735-3   2000   apx 300pp apx £96.00/US$157.00

NEW

Condensation Heat Transfer Enhancement

V.G. RIFERT, *Kiev, Ukraine*

In this monograph analysis and generalisation of the results of theoretical and experimental investigations of heat exchange during film condensation with variable methods of enhancement are described. Comparison of different calculation methods of enhanced condensation and effect of temperature difference, vapour shear, presence of non-condensable gases and heat exchange surface non-isothermness on average heat transfer coefficients is included.

Provisional Partial Contents: Hydrodynamics; Heat Exchange Methods of Calculation; Vapour Shear; Surface Tension Forces; Vapour Stream Twisting; Vibration of Surface.
Series: Developments in Heat Transfer
ISBN: 1-85312-538-5   2000   apx 300pp apx £96.00/US$157.00

NEW

Thermal-Hydraulic Analysis of Plate-and-Frame Heat Exchangers

Editors: **B. SUNDÉN**, *Lund Institute of Technology, Sweden and* **R.M. MANGLIK**, *University of Cincinnati, USA*

Plate-and-frame heat exchangers (PHEs) are used in many different processes at a broad range of temperatures and with a variety of substances. During recent years research into PHEs has increased considerably and there is now an urgent need for a state-of-the-art compilation of knowledge on this topic. This book fulfills this need. Containing invited contributions from prominent and active investigators in the area, it will enable graduate students, researchers, and research and development engineers in industry to achieve a better understanding of transport processes. Some guidelines for design and development are also included.

Contents: Introduction to Plate-and-Frame Heat Exchangers; Investigation of Fouling in Plate Heat Exchangers; Pressure Drop during Two-Phase Flow in Plate Heat Exchangers; Condensation in Plate-and-Frame Heat Exchangers; CFD-modelling in PHEs; A Computational Model for Conjugate Heat Transfer between Two Fluids in Plate Heat Exchangers of Arbitrary Geometry; Flow Structure in Plate Heat Exchangers; Effects of Fouling in PHEs; Flow Pattern and Heat Transfer in Plate Heat Exchangers; Local Heat Transfer Phenomena in PHEs; On Performance of Plate-and-Frame Heat Exchangers.
Series: Developments in Heat Transfer
ISBN: 1-85312-737-X   2000   apx 350pp apx £110.00/US$180.00

NEW

Computational Analysis of Convection Heat Transfer

Editors: **B. SUNDÉN**, *Lund Institute of Technology, Sweden and* **G. COMINI**, *Universita degli Studi di Udine, Italy*

The last few years have seen a prodigious outpouring of new information on the computational analysis of convection heat transfer and related fluid flow problems. Numerically based solutions are now the norm and are being applied to problems of increasing complexity.

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Series: Developments in Heat Transfer
ISBN: 1-85312-734-5   2000   apx 350pp apx £110.00/US$180.00

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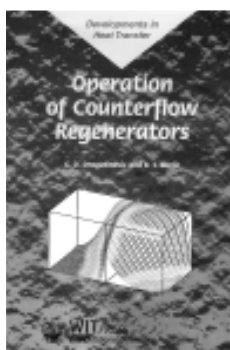
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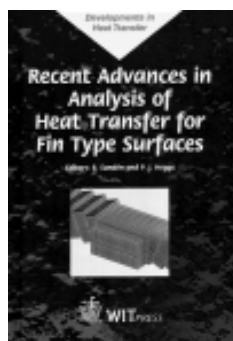
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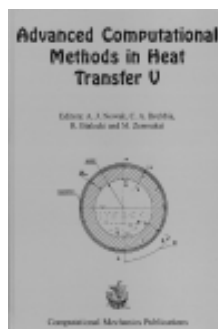
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Containing edited versions of the papers presented at the Fifth International Conference on Advanced Computational Methods in Heat Transfer, this book reflects the extensive research recently carried out in the field. The contributions featured are divided under the following headings: Heat Conduction; Natural and Forced Convection; Thermal Radiation; Phase Change Problems; Heat and Fluid Flow; Heat Exchangers; Computational Aspects; Industrial Applications.
Series: Computational Studies, Vol 1
ISBN: 1-85312-591-1   1998   600pp
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E. DIVO and **A.J. KASSAB**, *University of Central Florida, USA*

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The proceedings of the Fourth International Conference on Advanced Computational Methods in Heat Transfer.
Partial Contents: Conduction including Nonlinear Problems; Diffusion-Convection; Thermal Radiation; Fire and Combustion Simulation; Energy Power System; Combined Heat and Mass Transfer; Coupling Different Numerical Methods; Hot Spots and Thermal Shocks; Metal Casting; Welding, Forging and Other Processes; Phase Change.
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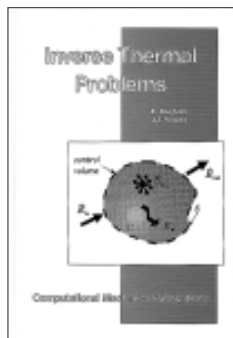
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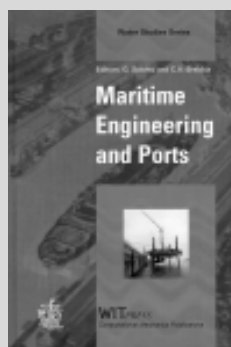
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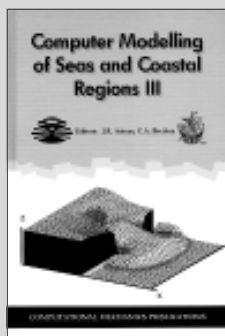
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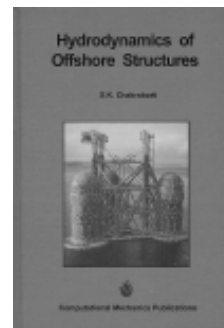
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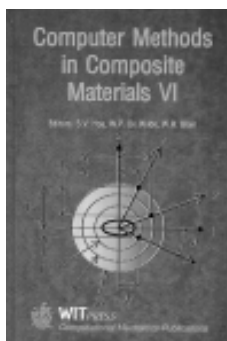
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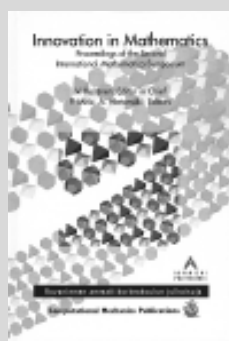
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Editors: V. KERÄNEN, P. MITIC and A. HIETAMÄKI, Rovaniemi Polytechnic, Finland

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A.S. CAKMAK, Princeton University, USA, and J.F. BOTHA, University of the Orange Free State, South Africa

Bringing together analytical and approximate methods for the solution of engineering problems, this book provides an introduction to computational mathematics for engineering students and graduate students in science departments. The level of mathematical rigour has been kept to a minimum, and examples are included at the end of each chapter to enhance the reader's understanding.
The text is divided into the following sections: Series; Evaluation of Integrals; Linear Algebra; Calculus of Variations and Introduction to Integral Equations; Linear Ordinary Differential Equations; Approximate Techniques for the Solution of ODEs (Perturbation Methods); Partial Differential Equations.
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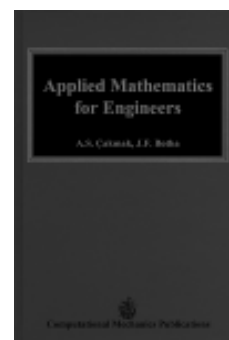
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Computational Methods and Experimental Measurements IX...p48

Numerical Methods in Engineering Simulation...p49

Computational Methods in Contact Mechanics IV

Editors: L. GAUL, University of Stuttgart, Germany and C.A. BREBBIA, Wessex Institute of Technology, UK

Due to modern advances in engineering design, contact problems have an impact in many technological fields. Great improvements in computer technology and in computational methods have made it possible to solve many complex practical problems accurately and efficiently. Containing contributions from the Fourth International Conference on Contact Mechanics, this book demonstrates that the discipline is still undergoing rapid development. The papers featured cover contact problems for machine elements such as gears, bearings, brakes, metal-forming tools, absorbers and joints; models and experimental results for rough surfaces in contact; contact problems for layered and reinforced half space regions studied by theory and by experiment; and improvements of contact description by finite element, boundary element, multi-body and continuous models, including new algorithms based on variational inequalities.
Series: Computational and Experimental Methods, Vol 2
ISBN: 1-85312-694-2   1999   552pp
£148.00/US$235.00

Computational Methods and Experimental Measurements IX

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

As computer models become ever more successful in simulating a widening range of engineering problems, it is even more essential that their progress be validated and verified. This book contains edited versions of the most relevant papers presented at the Ninth International Conference on Computational Methods and Experimental Measurements. The contributions included are divided under the following wide breadth of topics: Experimental Versus Analytical or Numerical Models; Interaction of Computer Codes and Experimental Models; Material Characterization Through Numerical Models and Experiments; Fluid Dynamics/Fluid Flow; Heat Transfer; Structural Problems and Stress Analysis; Vibrations; Material Problems and Identification; Computational Methods.
Series: Computational Engineering, Vol 2
ISBN: 1-85312-683-7   1999   648pp
£226.00/US$369.00

Moving Boundaries V
Computational Modelling of Free and Moving Boundary Problems

Editors: B. SARLER, LFDT, University of Ljubljana, Slovenia, C.A. BREBBIA and H. POWER, Wessex Institute of Technology, UK

In this book, the contributors at the Fifth International Conference on Computational Modelling of Free and Moving Boundary Problems consider the continuum of changing shape or problems related to the position of an interphase boundary. These problems, encountered extensively in nature as well in technology, can be analytically solved only in a few special cases. A new scientific discipline of discrete approximative solutions has therefore evolved, and the current state of the art is reflected in this volume. Although the types of phenomena differ considerably, several common computational features can be identified and similar problems can often be solved by different numerical methods.
The papers featured are divided under the following headings: Solidification and Melting; Stress and Deformation; Free Surface Flow; Numerical Methods; and Multi-Phase Flow.
Series: Computational and Experimental Methods, Vol 1
ISBN: 1-85312-691-8   1999   224pp
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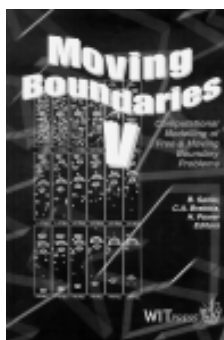
Computational Methods in Contact Mechanics III

Editors: M.H. ALIABADI, Wessex Institute of Technology, UK and A. SAMARTIN, Universidad Politecnica de Madrid, Spain

Containing the proceedings of the Third International Conference on Contact Mechanics, this book examines recent developments in computer technology and computational methods.
The thirty-six papers included are divided under the following headings: Mechanical Models; Numerical Aspects; Engineering Applications; Mathematical Models.
ISBN: 1-85312-468-0   1997   400pp
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Computational Methods and Experimental Measurements VIII

Editors: P. ANAGNOSTOPOULOS, University of Thessalonika, Greece, G.M. CARLOMAGNO, University of Naples, Italy and C.A. BREBBIA, Wessex Institute of Technology, UK

Featuring the proceedings of the Eighth International Conference on Computational Methods and Experimental Measurements, this book reviews developments on the interaction between numerical methods and experimental measurements.
Partial Contents: Experimental versus Analytical or Numerical Models; Interaction of Computer Codes and Experimental Models; Material Property Characterisation through Numerical Models and Experiments; Computer Interaction and Control of Real-Time Experiments, Interface with Computational Modes; System Implementation for Data Acquisition and Processing Phases.
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Computational Electromagnetics using Boundary Elements
Advances in Modelling Eddy Currents

J. SHEN, Technische Universitat, Berlin, Germany

Describes recent formulations, techniques and developments in applying the BEM to linear and nonlinear eddy current problems, and presents methods for improving accuracy and efficiency.
Series: Topics in Engineering, Vol 24
ISBN: 1-85312-375-7; 1-56252-298-1 (US, Canada, Mexico)   1995   264pp
£84.00/US$129.00

Moving Boundaries IV
Computational Modelling of Free and Moving Boundary Problems

Editors: **C.A. BREBBIA**, *Wessex Institute of Technology, UK and* **R. VAN KEER**, *University of Ghent, Belgium*

This book contains the proceedings of the Fourth International Conference on Computational Modelling of Free and Moving Boundary Problems. Its purpose is to promote interaction between engineers, applied mathematicians and numerical analysts involved in the creation, development and application of the computational methods used to solve these problems.
Partial Contents: Flow Through Porous Media; Wave Propagation in Solids and Liquids; Sedimentation and Infiltration; Cavitational Flow; Lubrication Problems; Metal Casting and Welding; Electroplating and Electrodeposition; Fracture Propagation; Contact Problems.
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Numerical Methods in Engineering Simulation

Editors: **M. CERROLAZA**, *Universidad Central de Venezuela,* **C. GAJARDO** *and* **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

Examining boundary elements, grid generation, innovative mathematical techniques, fracture mechanics, porous media, spectral methods and other topics, this title contains the proceedings of the International Conference on Numerical Methods in Engineering and Applied Sciences.
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Contact Mechanics using Boundary Elements

K.W. MAN, *Wessex Institute of Technology, UK*

This book presents a boundary element formulation for solving structural problems associated with frictional contact and develops and uses an efficient, iterative and fully load-incremental technique.
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Computational Methods for Smart Structures and Materials II

Editors: C.A. BREBBIA, Wessex Institute of Technology, UK, A. SAMARTIN and V. SANCHEZ GALVEZ, Technical University of Madrid, Spain

A smart structure is one which has the ability to determine its present state, decide on a set of actions that will change this state to a more desirable one, and carry these out in a controlled manner and in a short period of time. Such structures can theoretically accommodate unpredictable environmental changes, meet exacting performance requirements, and compensate for failure of minor system components.

In parallel with the development of smart structures, a generation of new materials which react to external stimuli in a non-conventional manner that can be interpreted as intelligent has also evolved.

Featuring contributions from a wide range of professionals involved in the field, this book contains the proceedings of the Second International Conference on Computational Methods for Smart Structures and Materials. Particular emphasis is placed on the application of computational methods to model, control and manage behaviour, and topics covered include sensor and actuator technologies, adaptive materials, physical systems modelling and analysis, active and passive control strategies, testing and verification, and analysis tools.

The design of smart structures and materials involves many disciplines and this volume will therefore appeal to civil, mechanical, aerospace, ocean and biomedical engineers, as well as to the microstructure and acoustic communities.
Series: Structures and Materials
ISBN: 1-85312-816-3   2000   apx 300pp apx £95.00/US$149.00

Computational Methods for Smart Structures and Materials

Editors: P. SANTINI and M. MARCHETTI, University of Rome 'La Sapienza', Italy, and C.A. BREBBIA, Wessex Institute of Technology, UK

This book includes some of the papers presented at the first international conference on this topic and covers: Analysis Tools; Physical Systems Modelling and Analysis; Sensor and Actuator Technologies; Damage Diagnosis; Active and Passive Control; Intelligent Control Systems; and Adaptive Materials and Structures.
Series: Structures and Materials, Vol 4
ISBN: 1-85312-600-4 1998   304pp £98.00/US$158.00

NEW

Structures Under Shock and Impact VI

Editors: N. JONES, University of Liverpool, UK and C.A. BREBBIA, Wessex Institute of Technology, UK

In this book engineers from civil, military, nuclear, offshore, aeronautical, transportation and other backgrounds report on developments in the specialised field of structural engineering that deals with structural response to explosive shocks and high- and low- velocity impact. The papers included were presented at the Sixth International Conference on Structures under Shock and Impact (SUSI) and topics covered include assessment of the residual strength of damaged structures, behaviour of various materials and structures, and design considerations for building structures that will withstand shocks better.
Series: Structures and Materials
ISBN: 1-85312-820-1   2000   apx 550pp apx £165.00/US$265.00
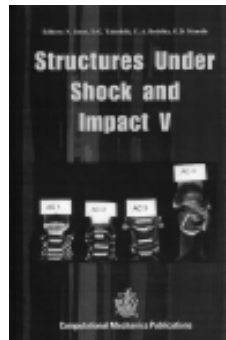
Structures Under Shock and Impact V

Editors: N. JONES, University of Liverpool, UK, D.G. TALASLIDIS, Aristotle University, Thessaloniki, Greece, C.A. BREBBIA, Wessex Institute of Technology,UK and G.D. MANOLIS, Aristotle University, Thessaloniki, Greece

This book contains most of the papers presented at the Fifth Structures under Shock and Impact Conference. The papers included are divided under the following headings: Structures under Blast and Explosive Shock; Buried Structures under Explosions; Structural Crashworthiness and Energy Absorbing Systems; Dynamic Behaviour of Structures; Full and Scale-Model Testing; Interaction between Analytical and Experimental Research; Seismic Engineering Applications; Material Response to High Rate Loading; Behaviour of Steel and Composite Structures; and Behaviour of Concrete Material and Structures.
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ISBN: 1-85312-590-3 1998   848pp £155.00/US$248.00

NEW

Mobile and Rapidly Assembled Structures III

Editors: F. ESCRIG, University of Seville, Spain, A. SAMARTIN, Technical University of Madrid, Spain and C.A. BREBBIA, Wessex Institute of Technology, UK

Structures which move in the course of normal use, or which have to be assembled at high speed on a relatively unprepared site, offer a particular challenge to the designer.

Featuring the proceedings of the Third International Conference on Mobile and Rapidly Assembled Structures, this volume brings together contributions by engineers, architects and researchers concerned with the design, analysis, manufacture and erection of such structures. The papers included will be of interest to a large number of professionals including military, civil, aeronautical, telecommunications, and construction engineers and architects.
Partial Contents: Rapidly Erected Bridges and Transportable Bridges; Radio Telescopes and Radar Dishes; Telescopic and Folding Masts; Tower Cranes and Mobile Lifting Apparatus; Leisure Structures, Demountable Grandstands and Scaffolding Systems; Inflated Buildings, Inflated Boats, Tenents and Membrane Shelters; Structures Subject to High Speed Rotation; Structures in Adverse Conditions; Rapid Repairs of Structures; Spacecraft Structures.
Series: Advances in Architecture
ISBN: 1-85312-817-1   2000   apx 350pp apx £108.00/US$173.00

Mobile and Rapidly Assembled Structures II

Editors: F. ESCRIG, University of Seville, Spain and C.A. BREBBIA, Wessex Institute of Technology, UK

Comprising the proceedings of the second international conference on this topic, this title covers: Deployable Structures; Fabric Architecture; Modular Structures; Architectural Concepts; Geometry; Transport; Towers and Masts; and Retractable Structures.
ISBN: 1-85312-398-6 1996   448pp £128.00/US$192.00

Computer Aided Optimum Design of Structures VI

Editors: S. HERNANDEZ, Universidad de La Coruna, Spain, A.J. KASSAB, University of Central Florida, USA and C.A. BREBBIA, Wessex Institute of Technology,UK

In this volume key researchers and engineers from universities, private and public research centres, and industry present recent advances in structural optimization. They also demonstrate how the various techniques discussed can be applied to applications within engineering such as the design of aircraft and the analysis of civil and mechanical engineering components. The contributions come from the sixth in a series of successful international conferences interweaving the themes of computer-aided design and optimization.

The 35 papers presented are divided under the following headings: Shape and Topology Optimization; Optimal Control; Optimization in Non-Linear Structural Analysis; Expert Systems and Knowledge Based Optimization; Multi-Objective Optimization; Advances in Numerical Optimization; Emergent Applications of Design Optimization; Applications in Structural Engineering; Integrated Packages for Optimum Design; Applications in Mechanical Engineering.
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Computer Aided Optimum Design of Structures V

Editors: S. HERNÁNDEZ, Universidad de la Coruna, Spain and C.A. BREBBIA, Wessex Institute of Technology, UK

Containing the proceedings of the Fifth International Conference on Computer Aided Optimum Design of Structures, this book examines state-of-the-art advances in structural optimisation, and demonstrates how they can best be applied to engineering practice. Topics featured include: Large, Complex and Continuum Structures; New Methods and Reliability Based Design; Shape, Topology and Material Optimisation; Design Sensitivity Analysis; and Optimal Control and Identification.
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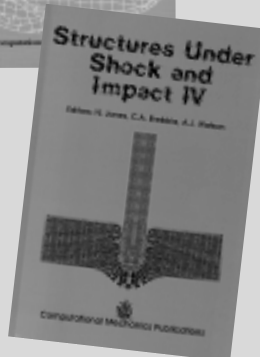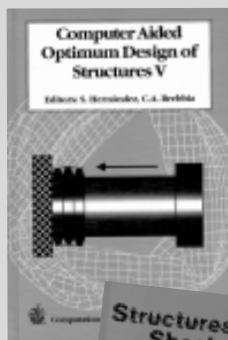
Structures Under Shock and Impact IV

Editors: N. JONES, University of Liverpool, UK, C.A. BREBBIA, Wessex Institute of Technology, UK and A.J. WATSON, University of Sheffield, UK

The proceedings of the Fourth International Conference on Structures Under Shock and Impact. Subjects featured include: Surface Structures Under Explosive Shock; Protection of Civilian Structures from Blast Loads; Missile Penetration and Explosion; Collision Force of Structures; Demolition of Structures; Full and Model-Scale Testing; and Energy Absorbing Systems.
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Shock and Impact on Structures

Editors: C.A. BREBBIA, Wessex Institute of Technology, UK and V. SANCHEZ GALVEZ, Technical University of Madrid, Spain

Written by renowned researchers in the field of structures under shock and impact, this book covers a wide variety of topics including numerical simulation of high rate behaviour, the dynamic response of ceramics to shock wave loading, concrete structures under soft impact loads and impact problems in aeroengines.
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Covering an area of study that is of essential concern for the development, efficient operation, and healthy lifestyle of cities around the world, this book contains the proceedings of the Sixth International Conference on Urban Transport and the Environment for the 21st Century. It addresses the effective integration of various modes of transportation, advances in analysis and traffic management, and new transport systems, all from the point of view of their effects on the environment. The contributors are researchers from government, academia and industry currently involved in working to understand the problem of urban transportation and to develop solutions.
Papers are divided under the following headings: Urban Transport Systems; Planning, Funding and Management; Environmental Aspects; Emerging Technologies; and Vehicles.
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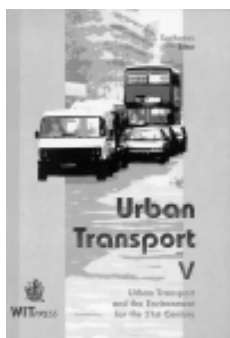
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Featuring papers from the fifth conference in this series, this book reflects the major preoccupation with the environment, an area of investigation which, if anything, is set to increase still further. The volume contains the work of scientists from around the world, each bringing their own particular urban experiences to enrich the transportation debate, and papers are divided under the following headings: Environmental Aspects; Air Quality; Emissions; Urban Transport; Parking; Freight; Traffic Modelling; Location Planning; Cost Studies; Noise Pollution; and City Planning.
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Editor: **C.A. BREBBIA**, *Wessex Institute of Technology, UK*

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Series: Advances in Transport, Vol 3
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Urban Transport and the Environment for the 21st Century IV

Editors: **C. BORREGO**, *University of Aveiro, Portugal* and **L.J. SUCHAROV**, *Wessex Institute of Technology, UK*

Providing readers with a wide variety of studies and research in the broad field of urban transport, this book contains the proceedings of the fourth international conference on this topic. The 58 papers featured come from around the world and cover recent developments in urban transport systems, planning funding and management, environmental aspects, vehicle technology and structures.
Series: Advances in Transport, Vol 1
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NEW

Computers in Railways VII

Editors: **J. ALLAN**, *University of Birmingham, UK*, **C.A. BREBBIA**, *Wessex Institute of Technology, UK*, **R.J. HILL**, *University of Bath, UK*, **G. SCIUTTO**, *Università degli Studi di Genova, Italy* and **S. SONE**, *University of Tokyo, Japan*

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Series: Advances in Transport
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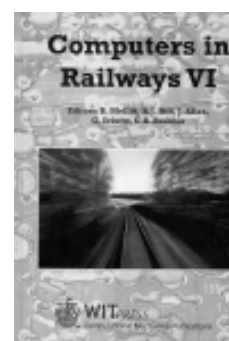
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This book contains the proceedings of the Sixth International Conference on Computer Aided Design, Manufacture and Operation in the Railway. Both underlying technology and environmental issues are covered.
The 104 papers included are divided under the following headings: Infrastructure; Safety Critical Systems; Planning, Systems Engineering and EMC; Scheduling and Freight Distribution; Vehicle Dynamics and Fatigue; Power Supply and Traction; Traffic Control; Maintenance; Ticketing; Multi-Train Simulator; Pantograph/Catenary; Human Interface and Decision Support; Block Signalling and Interlocking and ATC and Signalling Equipment.
Series: Advances in Transport, Vol 2
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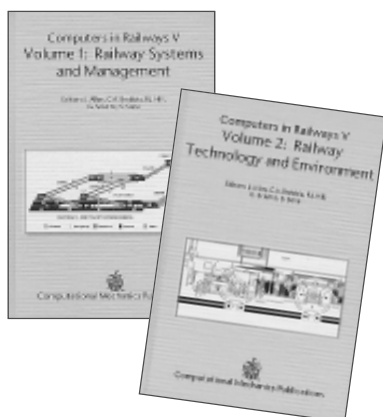
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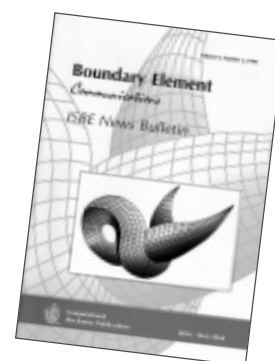
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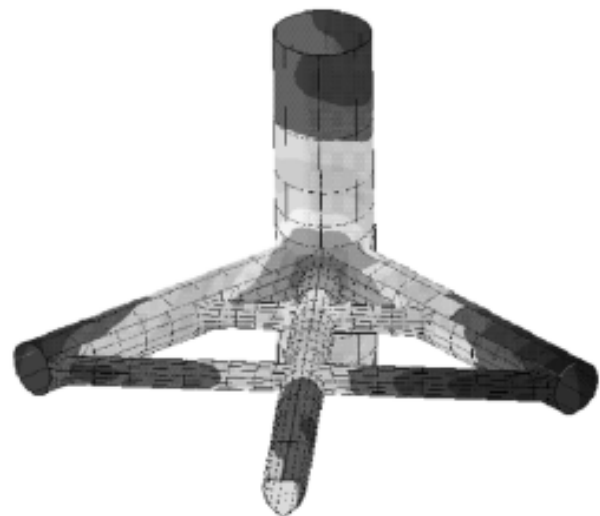
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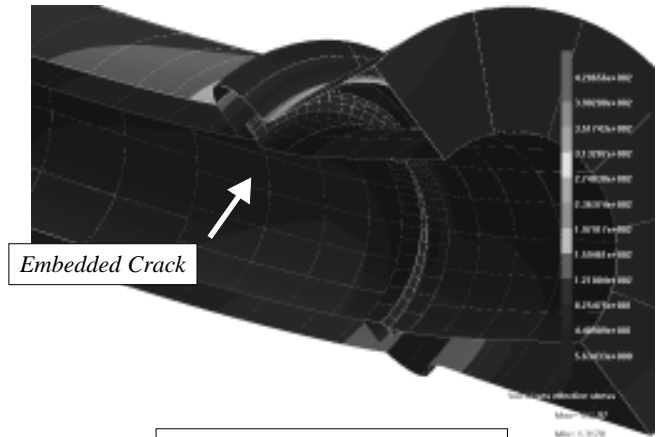
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