Computational Wave Dynamics Advanced Series On Oc

CLARA MATTEO

Physical Models and Laboratory Techniques in Coastal Engineering
Computational Wave Dynamics
This NATO Advanced Study Institute was concerned with modern ab initio methods for the determination of the electronic structure of molecules. Recent years have seen considerable progress in computer technology and computer science and these developments have had a very significant influence on computational molecular physics. Progress in computer technology has led to increasingly larger and faster systems as well as powerful minicomputers. Simultaneous research in computer science has explored new methods for the optimal use of these resources. To a large extent develop ments in computer technology, computer science and computational molecular physics have been mutually dependent. The availability of new computational resources, particularly minicomputers and, more recently, vector processors, has stimulat'ed a great deal of research in molecular physics. Well established techniques have been reformulated to make more efficient use of the new computer technology and algorithms which were previously computationally intractable have now been successfully implemented. This research has given a new and exciting insight into molecular structure and molecular processes by enabling smaller systems to be studied in greater detail and larger systems to be studied for the first time.
High-Order Methods for Incompressible Fluid Flow Princeton University Press
Publisher Description
Atmospheric and Oceanic Fluid Dynamics
Springer Science & Business Media
This book contains contributions from experts in the field of numerical modelling for coastal engineering. Chapters present state-of-the-art numerical approaches in fluid structure interaction ranging from wave-breakwater interaction to the complex scouring that occurs around coastal structures.
Tsunami: Engineering Perspective For Mitigation, Protection And Modeling
Springer Science & Business Media
The aim of this book is to present selected theoretical topics on ocean wave dynamics, including basic principles and applications in coastal and offshore engineering, all from the deterministic point of view. The bulk of the material deals with the linearized theory.
Linear and Nonlinear Waves John Wiley &

Sons
An introduction to the rapidly evolving methodology of electronic excited states For academic researchers, postdocs, graduate and undergraduate students, Quantum Chemistry and Dynamics of Excited States: Methods and Applications reports the most updated and accurate theoretical techniques to treat electronic excited states. From methods to deal with stationary calculations through time-dependent simulations of molecular systems, this book serves as a guide for beginners in the field and knowledge seekers alike. Taking into account the most recent theory developments and representative applications, it also covers the often-overlooked gap between theoretical and computational chemistry. An excellent reference for both researchers and students, Excited States provides essential knowledge on quantum chemistry, an in-depth overview of the latest developments, and theoretical techniques around the properties and nonadiabatic dynamics of chemical systems. Readers will learn: ● Essential theoretical techniques to describe the properties and dynamics of chemical systems ● Electronic Structure methods for stationary calculations ● Methods for electronic excited states from both a quantum chemical and time-dependent point of view ● A breakdown of the most recent developments in the past 30 years For those searching for a better understanding of excited states as they relate to chemistry, biochemistry, industrial chemistry, and beyond, Quantum Chemistry and Dynamics of Excited States provides a solid education in the necessary foundations and important theories of excited states in photochemistry and ultrafast phenomena.
The Dynamics of Marine Craft CRC Press
The book gives the reader the basis for understanding the way numerical schemes achieve accurate and stable simulations of physical phenomena. It is based on the finite-difference method and simple problems that allow also the analytic solutions to be worked out. ODEs as well as hyperbolic, parabolic and elliptic types are treated. The book builds on simple model equations and, pedagogically, on a host of problems given together with their solutions.
Design And Construction Of Berm Breakwaters World Scientific
Numerical methods are indispensable tools in the analysis of complex fluid flows. This book focuses on computational techniques for high-speed gas flows, especially gas flows containing shocks and other steep gradients. The book decomposes complicated numerical methods into simple modular parts, showing how each part fits and how each method relates to or differs from others. The text begins with a review of gasdynamics and computational techniques. Next come basic principles of computational gasdynamics. The last two parts cover basic techniques and advanced techniques. Senior and graduate level students, especially in aerospace engineering, as well as researchers and practising engineers, will find a wealth of invaluable information on high-speed gas flows in this text.
Coastal Engineering: Theory And Practice World Scientific
This book can potentially serve as a comprehensive textbook for students pursuing this subject either as degree or an elective course. It covers all the fundamental physics behind the different phenomena taking place in the near shore regions and the coast as well as the various methods to estimate its impact. Basic knowledge of water wave mechanics is crucial in understanding the coastal processes taking place in the near shore. The assessment of incident forces due to wind, wave, tide, current etc. is important to evaluate the resultant impact they cause on the shoreline and structures.This book emphasizes the importance of sediment dynamics by analyzing the sediment characteristics, the physics of its motion and movement, factors responsible for the fate of sediments etc. It also highlights the erosion problem which is most prevalent across the sandy coasts, additionally erosion combating methods and techniques are also described with real time field problems and their solutions.A wide range of coastal structures and their design principles are included in this book in order to give the reader a holistic understanding to the readers. This book also includes the design challenges and introduces the reliable modeling tools and techniques, which is very useful for beginners working in this discipline.
The Applied Dynamics of Ocean Surface Waves World Scientific
Modern design of berm breakwaters began about thirty years ago. However, to date, there has been a lack of a well-established, formal design methodology on berm breakwaters. The authors Dr Jentsje van der Meer and Sigurdur Sigurdarson combine over 40 years of collective experience working with breakwaters to put forward a design framework in Design and Construction of Berm Breakwaters; covering the science and design practices of berm breakwater structures. The original design consisted of mass armoured berms that reshaped into statically stable S-shaped slopes. The design was adopted in Iceland and eventually led to a development with more stable structures by using available rock sizes, large rock, and more rock gradings than just 'small rock (core)' and 'large rock (berm)'. This more stable and only partly reshaping structure is called the Icelandic-type berm breakwater.Written for researchers and practitioners, the volume consists of chapters on geometrical designs of the berm breakwater cross-section, including berm reshaping and wave overtopping, quarry and project management, as well as blasting and sorting techniques, designs for various wave conditions and available rock classes, and case studies of already constructed berm breakwaters.
Advanced Numerical Modelling of Wave Structure Interaction Springer Nature
Computational Approaches in Physics reviews computational schemes which are used in the simulations of physical systems. These range from very accurate ab initio techniques up to coarse-grained and mesoscopic schemes. The choice of the method is based on the desired accuracy and computational efficiency. A bottom-up approach is used to present the various simulation methods used in Physics, starting from the lower level and the most accurate methods, up to particle-based ones. The book outlines the basic theory underlying each technique and its complexity, addresses the computational implications and issues in the implementation, as well as present representative examples. A link to the most common computational codes, commercial or open source is listed in each chapter. The strengths and deficiencies of the variety of techniques discussed in this book are presented in detail and visualization tools commonly used to make the simulation data more comprehensive are also discussed. In the end, specific techniques are used as bridges across different disciplines. To this end, examples of different systems tackled with the same methods are presented. The appendices include elements of physical theory which are prerequisites in understanding the simulation methods.
Computational and Experimental Simulations in Engineering World Scientific Publishing Company
An introductory text to a range of numerical methods used today to simulate time-dependent processes in Earth science, physics, engineering and many other fields. It looks under the hood of current simulation technology and

provides guidelines on what to look out for when carrying out sophisticated simulation tasks.

Introduction to Coastal Engineering and Management Morgan & Claypool Publishers

This book is intended as an introductory textbook for graduate students and as a reference book for engineers and scientists working in the field of coastal engineering. As such it gives a description of the theories for wave and nearshore hydrodynamics. It is meant to de-mystify the topics and hence starts at a fairly basic level. It requires knowledge of fluid mechanics equivalent to a first year graduate level. At the end of each topic, an attempt is made to give an overview of the present stage of the scientific development in that area with numerous references for further studies.

Quantum Chemistry and Dynamics of Excited States World Scientific

This book provides a comprehensive description of the latest theory-supported numerical technologies, as well as scientific and engineering applications for water surface waves. Its contents are crafted to cater to a step-by-step learning of computational wave dynamics and ocean wave modeling. It provides a comprehensive description from underlying theories of free-surface flows, to practical computational applications for coastal and ocean engineering on the basis of computational fluid dynamics (CFD).The text may be used as a textbook for advanced undergraduate students and graduate students to understand the theoretical background of wave computations, and the recent progress of computational techniques for free-surface and interfacial flows, such as Volume of Fluid (VOF), Constrained Interpolation Profile (CIP), Lagrangian Particle (SPH, MPS), Distinct Element (DEM) and Euler-Lagrange Hybrid Methods.It is also suitable for researchers and engineers who wish to apply CFD techniques to ocean modeling and practical coastal problems involving sediment transport, wave-structure interaction and surf zone flows.

River Flow 2020 John Wiley & Sons

Author Franz J. Vesely offers students an introductory text on computational physics, providing them with the important basic numerical/computational techniques. His unique text sets itself apart from others by focusing on specific problems of computational physics. The author also provides a selection of modern fields of research. Students will benefit from the appendixes which offer a short description of some properties of computing and machines and outline the technique of 'Fast Fourier Transformation.'

Computational Seismology World Scientific

Computational Wave DynamicsWorld Scientific Publishing Company

Computational Fluid Dynamics World Scientific

With contributions from key researchers across the globe, and edited by internationally recognized leading academics, Gravel-bed Rivers: Processes and Disasters presents the definitive review of current knowledge of gravel-bed rivers. Continuing an established and successful series of scholarly reports, this book consists of the papers presented at the 8th International Gravel-bed Rivers Workshop. Focusing on all the recent progress that has been made in the field, subjects covered include flow, physical modeling, sediment transport theory, techniques and instrumentation, morphodynamics and ecological topics, with special attention given to aspects of disasters relevant to sediment supply and integrated river management. This up-to-date compendium is essential reading for geomorphologists, river engineers and ecologists, river managers, fluvial sedimentologists and advanced students in these fields.

Hydrodynamics Around Cylindrical Structures World Scientific Publishing Company

This book is an introductory treatment to coastal and estuarine processes for earth scientists or engineers. Suitable for a first course on the subject, it covers water waves, surf zone hydrodynamics, tides in oceans and estuaries, storm surges, estuarine mixing, basic sediment transport, coastal morphodynamics and coastal groundwater dynamics. The book contains a substantial amount of new material. For example, the explicit, analytical treatment of transient, forced long waves strongly enhances the discussion on tsunami, storm surges and surf beat. The treatment of turbulent mixing includes finite mixing length effects, which provide an explanation for differential diffusion of different sediment sizes in suspension. The recently discovered effects of acceleration skewness and boundary layer streaming are also included in the basic sediment transport models. In addition, the treatment of beach groundwater dynamics: The mechanisms by which waves as well as tides drive groundwater motion, builds the link between the previously unconnected fields of coastal hydraulics and regional groundwater modeling. To serve as an effective reference book for professionals, the book is fully indexed and comprehensively cross referenced.

Turbulence In Coastal And Civil Engineering Springer

This book discusses the subject of turbulence encountered in coastal and civil engineering.The primary aim of the book is to describe turbulence processes including transition to turbulence; mean and fluctuating flows in channels/pipes, and in currents; wave boundary layers (including boundary layers under solitary waves); streaming processes in wave boundary layers; turbulence processes in breaking waves including breaking solitary waves; turbulence processes such as bursting process and their implications for sediment transport; flow resistance in steady and wave boundary layers; and turbulent diffusion and dispersion processes in the coastal and river environment, including sediment transport due to diffusion/dispersion.Both phenomenological and statistical theories are described in great detail. Turbulence modelling is also described, and several examples for modelling of turbulence in steady flow and wave boundary layers are presented.The book ends with a chapter containing hands-on exercises on a wide variety of turbulent flows including experimental study of turbulence in an open-channel flow, using Laser Doppler Anemometry; Statistical, correlation and spectral analysis of turbulent air jet flow; Turbulence modelling of wave boundary layer flows; and numerical modelling of dispersion in a turbulent boundary layer, a set of exercises used by the authors in their Masters classes over many years.Although the book is essentially intended for professionals and researchers in the area of Coastal and Civil Engineering, and as a text book for graduate/post graduate students, the contents of the book will, however, additionally provide sufficient background in the study of turbulent flows relevant to many other disciplines, such as Wind Engineering, Mechanical Engineering, and Environmental Engineering.

Coastal and Estuarine Processes Springer Science & Business Media

Laboratory physical models are a valuable tool for coastal engineers. Physical models help us to understand the complex hydrodynamic processes occurring in the nearshore zone and they provide reliable and economic engineering design solutions.This book is about the art and science of physical modeling as applied in coastal engineering. The aim of the book is to consolidate and synthesize into a single text much of the knowledge about physical modeling that has been

developed worldwide.This book was written to serve as a graduate-level text for a course in physical modeling or as a reference text for engineers and researchers engaged in physical modeling and laboratory experimentation. The first three chapters serve as an introduction to similitude and physical models, covering topics such as advantages and disadvantages of physical models, systems of units, dimensional analysis, types of similitude and various hydraulic similitude criteria applicable to coastal engineering models.Practical application of similitude principles to coastal engineering studies is covered in Chapter 4 (Hydrodynamic Models), Chapter 5 (Coastal Structure Models) and Chapter 6 (Sediment Transport Models). These chapters develop the appropriate similitude criteria, discuss inherent laboratory and scale effects and overview the technical literature pertaining to these types of models. The final two chapters focus on the related subjects of laboratory wave generation (Chapter 7) and measurement and analysis techniques (Chapter 8).

Mechanics of Coastal Sediment Transport

Cambridge University Press

Now in an accessible paperback edition, this classic work is just as relevant as when it first appeared in 1974, due to the increased use of nonlinear waves. It covers the behavior of waves in two parts, with the first part addressing hyperbolic waves and the second addressing dispersive waves. The mathematical principles are presented along with examples of specific cases in communications and specific physical fields, including flood waves in rivers, waves in glaciers, traffic flow, sonic booms, blast waves, and ocean waves from storms.