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KEY=STRUCTURE - PAOLA LEON

Computational Fluid-Structure Interaction Methods and Applications John Wiley & Sons Computational Fluid-Structure Interaction: Methods andApplications takes the reader from the fundamentals ofcomputational fluid and solid mechanics to the state-of-the-art incomputational FSI methods, special FSI techniques, and solution ofreal-world problems. Leading experts in the field present thematerial using a unique approach that combines advanced methods,special techniques, and challenging applications. This book begins with the differential equations governing thefluid and solid mechanics, coupling conditions at thefluid–solid interface, and the basics of the finite elementmethod. It continues with the ALE and space–time FSI methods,spatial discretization and time integration strategies for thecoupled FSI equations, solution techniques for thefully-discretized coupled equations, and advanced FSI andspace–time methods. It ends with special FSI techniquestargeting cardiovascular FSI, parachute FSI, and wind-turbineaerodynamics and FSI. Key features: First book to address the state-of-the-art in computationalFSI Combines the fundamentals of computational fluid and solidmechanics, the state-of-the-art in FSI methods, and specialFSI techniques targeting challenging classes of real-worldproblems Covers modern computational mechanics techniques, includingstabilized, variational multiscale, and space–time methods,isogeometric analysis, and advanced FSI coupling methods Is in full color, with diagrams illustrating the fundamentalconcepts and advanced methods and with insightful visualizationillustrating the complexities of the problems that can be solvedwith the FSI methods covered in the book. Authors are award winning, leading global experts incomputational FSI, who are known for solving some of the mostchallenging FSI problems Computational Fluid-Structure Interaction:

Methods andApplications is a comprehensive reference for researchers andpracticing engineers who would like to advance their existingknowledge on these subjects. It is also an ideal text for graduateand senior-level undergraduate courses in computational fluidmechanics and computational FSI. Modern Fluid Dynamics Basic Theory and Selected Applications in Macro- and Micro-Fluidics Springer Science & Business Media This textbook covers essentials of traditional and modern fluid dynamics, i. e. , the fundamentals of and basic applications in fluid mechanics and convection heat transfer with brief excursions into fluid-particle dynamics and solid mechanics. Specifically, it is suggested that the book can be used to enhance the knowledge base and skill level of engineering and physics students in macro-scale fluid mechanics (see Chaps. 1–5 and 10), followed by an int- ductory excursion into micro-scale fluid dynamics (see Chaps. 6 to 9). These ten chapters are rather self-contained, i. e. , most of the material of Chaps. 1–10 (or selectively just certain chapters) could be taught in one course, based on the students' background. Typically, serious seniors and first-year graduate students form a receptive audience (see sample syllabus). Such as target group of students would have had prerequisites in thermodynamics, fluid mechanics and solid mechanics, where Part A would be a welcomed refresher. While introductory fluid mechanics books present the material in progressive order, i. e. , employing an inductive approach from the simple to the more difficult, the present text adopts more of a deductive approach. Indeed, understanding the derivation of the basic equations and then formulating the system-specific equations with suitable boundary conditions are two key steps for proper problem solutions. Fluid-Structure-Sound Interactions and Control Proceedings of the 4th Symposium on Fluid-Structure-Sound Interactions and Control Springer This book presents the proceedings of the Symposium on Fluid-Structure-Sound Interactions and Control (FSSIC), (held in Tokyo on Aug. 21-24, 2017), which largely focused on advances in the theory, experiments on, and numerical simulation of turbulence in the contexts of flow-induced vibration, noise and their control. This includes several practical areas of application, such as the aerodynamics of road and space vehicles, marine and civil engineering, nuclear reactors and biomedical science, etc. Uniquely, these proceedings integrate acoustics with the study of flow-induced vibration, which is not a common practice but can be extremely beneficial to understanding, simulating and controlling vibration. The symposium provides a vital forum where academics, scientists and engineers working in all related branches can exchange and share their latest findings, ideas and innovations – bringing together researchers from both east and west to chart the frontiers of FSSIC. Numerical Simulation of Wind Turbines MDPI The book contains the research contributions belonging to the Special Issue "Numerical Simulation of Wind Turbines", published in 2020-2021. They consist of 15 original research papers and 1 editorial. Different topics are discussed, from innovative design solutions for large and small wind turbine to

control, from advanced simulation techniques to noise prediction. The variety of methods used in the research contributions testifies the need for a holistic approach to the design and simulation of modern wind turbines and will be able to stimulate the interest of the wind energy community. Fluid-Structure Interaction An Introduction to Finite Element Coupling John Wiley & Sons Fluid-Structure Interaction: An Introduction to Finite Element Coupling fulfils the need for an introductive approach to the general concepts of Finite and Boundary Element Methods for FSI, from the mathematical formulation to the physical interpretation of numerical simulations. Based on the author's experience in developing numerical codes for industrial applications in shipbuilding and in teaching FSI to both practicing engineers and within academia, it provides a comprehensive and self-contained guide that is geared toward both students and practitioners of mechanical engineering. Composed of six chapters, Fluid–Structure Interaction: An Introduction to Finite Element Coupling progresses logically from formulations and applications involving structure and fluid dynamics, fluid and structure interactions and opens to reduced order-modelling for vibro-acoustic coupling. The author describes simple yet fundamental illustrative examples in detail, using analytical and/or semi-analytical formulation & designed both to illustrate each numerical method and also to highlight a physical aspect of FSI. All proposed examples are simple enough to be computed by the reader using standard computational tools such as MATLAB, making the book a unique tool for self-learning and understanding the basics of the techniques for FSI, or can serve as verification and validation test cases of industrial FEM/BEM codes rendering the book valuable for code verification and validation purposes. Fluid-Structure Interaction Modelling, Simulation, Optimisation Springer Science & Business Media This volume in the series Lecture Notes in Computational Science and Engineering presents a collection of papers presented at the International Workshop on FSI, held in October 2005 in Hohenwart and organized by DFG's Research Unit 493 "FSI: Modeling, Simulation, and Optimization". The papers address partitioned and monolithic coupling approaches, methodical issues and applications, and discuss FSI from the mathematical, informatics, and engineering points of view. Fluid-Structure Interactions and Uncertainties Ansys and Fluent Tools John Wiley & Sons This book is dedicated to the general study of fluid structure interaction with consideration of uncertainties. The fluid-structure interaction is the study of the behavior of a solid in contact with a fluid, the response can be strongly affected by the action of the fluid. These phenomena are common and are sometimes the cause of the operation of certain systems, or otherwise manifest malfunction. The vibrations affect the integrity of structures and must be predicted to prevent accelerated wear of the system by material fatigue or even its destruction when the vibrations exceed a certain threshold. Management of Obstructive Sleep Apnea An Evidence-Based, Multidisciplinary Textbook Springer Nature This book provides comprehensive information on the

etiology, pathophysiology, medical implications, diagnosis, and surgical and nonsurgical treatment of obstructive sleep apnea (OSA). Divided into five parts, the book begins with principles and fundamentals of OSA and its diagnostic considerations. Subsequent parts then address non-surgical management, surgical management, and maxillomandibular advancements for OSA. Chapters seek to approach this common disorder from the viewpoint of multiple specialties, thereby promoting the development of a broad strategy for the evaluation and management of OSA patients that draws on each of them. An invaluable reference, Management of Obstructive Sleep Apnea: An Evidence-Based, Multidisciplinary Textbook meets the needs of advanced dental and medical students, orthodontic, maxillofacial, ENT, neurology, and plastic surgery residents, and sleep medicine and pulmonary physicians. Proceedings of the ASME Pressure Vessels and Piping Conference--2006: Fluid-structure interaction (pts. A-B) Proceedings of the ASME Pressure Vessels and Piping Conference--2006: Fluid-structure interaction American Society of Mechanical Engineers Fundamentals of Fluid Mechanics Fluid-Structure Interactions Slender Structures and Axial Flow Academic Press The first of two books concentrating on the dynamics of slender bodies within or containing axial flow, Fluid-Structure Interaction, Volume 1 covers the fundamentals and mechanisms giving rise to flow-induced vibration, with a particular focus on the challenges associated with pipes conveying fluid. This volume has been thoroughly updated to reference the latest developments in the field, with a continued emphasis on the understanding of dynamical behaviour and analytical methods needed to provide long-term solutions and validate the latest computational methods and codes. In this edition, Chapter 7 from Volume 2 has also been moved to Volume 1, meaning that Volume 1 now mainly treats the dynamics of systems subjected to internal flow, whereas in Volume 2 the axial flow is in most cases external to the flow or annular. Provides an in-depth review of an extensive range of fluid-structure interaction topics, with detailed real-world examples and thorough referencing throughout for additional detail Organized by structure and problem type, allowing you to dip into the sections that are relevant to the particular problem you are facing, with numerous appendices containing the equations relevant to specific problems Supports development of long-term solutions by focusing on the fundamentals and mechanisms needed to understand underlying causes and operating conditions under which apparent solutions might not prove effective Arbitrary Lagrangian Eulerian and Fluid-Structure Interaction Numerical Simulation John Wiley & Sons This book provides the fundamental basics for solving fluidstructure interaction problems, and describes different algorithmsand numerical methods used to solve problems where fluid andstructure can be weakly or strongly coupled. These approaches areillustrated with examples arising from industrial or academicapplications. Each of these approaches has its own performance andlimitations. Given the book’s comprehensive coverage,engineers,

graduate students and researchers involved in thesimulation of practical fluid structure interaction problems willfind this book extremely useful. The Shock and Vibration Bulletin Computational Science – ICCS 2018 18th International Conference, Wuxi, China, June 11–13, 2018 Proceedings, Part III Springer The three-volume set LNCS 10860, 10861 and 10862 constitutes the proceedings of the 18th International Conference on Computational Science, ICCS 2018, held in Wuxi, China, in June 2018. The total of 155 full and 66 short papers presented in this book set was carefully reviewed and selected from 404 submissions. The papers were organized in topical sections named: Part I: ICCS Main Track Part II: Track of Advances in High-Performance Computational Earth Sciences: Applications and Frameworks; Track of Agent-Based Simulations, Adaptive Algorithms and Solvers; Track of Applications of Matrix Methods in Artificial Intelligence and Machine Learning; Track of Architecture, Languages, Compilation and Hardware Support for Emerging ManYcore Systems; Track of Biomedical and Bioinformatics Challenges for Computer Science; Track of Computational Finance and Business Intelligence; Track of Computational Optimization, Modelling and Simulation; Track of Data, Modeling, and Computation in IoT and Smart Systems; Track of Data-Driven Computational Sciences; Track of Mathematical-Methods-and-Algorithms for Extreme Scale; Track of Multiscale Modelling and Simulation Part III: Track of Simulations of Flow and Transport: Modeling, Algorithms and Computation; Track of Solving Problems with Uncertainties; Track of Teaching Computational Science; Poster Papers Analysis and Applications of Lattice Boltzmann Simulations IGI Global Programming has become a significant part of connecting theoretical development and scientific application computation. Fluid dynamics provide an important asset in experimentation and theoretical analysis. Analysis and Applications of Lattice Boltzmann Simulations provides emerging research on the efficient and standard implementations of simulation methods on current and upcoming parallel architectures. While highlighting topics such as hardware accelerators, numerical analysis, and sparse geometries, this publication explores the techniques of specific simulators as well as the multiple extensions and various uses. This book is a vital resource for engineers, professionals, researchers, academics, and students seeking current research on computational fluid dynamics, high-performance computing, and numerical and flow simulations. Computational Fluid-Structure Interaction Methods, Models, and Applications Academic Press Computational Fluid-Structure Interaction: Methods, Models, and Applications provides detailed explanations of a range of FSI models, their mathematical formulations, validations, and applications, with an emphasis on conservative unstructured-grid FVM. The first part of the book presents the nascent numerical methods, algorithms and solvers for both compressible and incompressible flows, computational structural dynamics (CSD), parallel multigrid, IOM, IMM and ALE methods. The second half covers the validations of these numerical methods and solvers, as well as

their applications in a broad range of areas in basic research and engineering. Provides a comprehensive overview of the latest numerical methods used in FSI, including the unstructured-grid finite volume method (FVM), parallel multigrid scheme, overlapping mesh, immersed object method (IOM), immersed membrane method (IMM), arbitrary Lagragian-Eulerian (ALE), and more Provides full details of the numerical methods, solvers and their validations Compares different methods to help readers more effectively choose the right approach for their own FSI problems Features real-life FSI case studies, such as large eddy simulation of aeroelastic flutter of a wing, parallel computation of a bio-prosthetic heart valve, and ALE study of a micro aerial vehicle Computational Science – ICCS 2020 20th International Conference, Amsterdam, The Netherlands, June 3–5, 2020, Proceedings, Part VI Springer Nature The seven-volume set LNCS 12137, 12138, 12139, 12140, 12141, 12142, and 12143 constitutes the proceedings of the 20th International Conference on Computational Science, ICCS 2020, held in Amsterdam, The Netherlands, in June 2020.* The total of 101 papers and 248 workshop papers presented in this book set were carefully reviewed and selected from 719 submissions (230 submissions to the main track and 489 submissions to the workshops). The papers were organized in topical sections named: Part I: ICCS Main Track Part II: ICCS Main Track Part III: Advances in High-Performance Computational Earth Sciences: Applications and Frameworks; Agent-Based Simulations, Adaptive Algorithms and Solvers; Applications of Computational Methods in Artificial Intelligence and Machine Learning; Biomedical and Bioinformatics Challenges for Computer Science Part IV: Classifier Learning from Difficult Data; Complex Social Systems through the Lens of Computational Science; Computational Health; Computational Methods for Emerging Problems in (Dis-)Information Analysis Part V: Computational Optimization, Modelling and Simulation; Computational Science in IoT and Smart Systems; Computer Graphics, Image Processing and Artificial Intelligence Part VI: Data Driven Computational Sciences; Machine Learning and Data Assimilation for Dynamical Systems; Meshfree Methods in Computational Sciences; Multiscale Modelling and Simulation; Quantum Computing Workshop Part VII: Simulations of Flow and Transport: Modeling, Algorithms and Computation; Smart Systems: Bringing Together Computer Vision, Sensor Networks and Machine Learning; Software Engineering for Computational Science; Solving Problems with Uncertainties; Teaching Computational Science; UNcErtainty QUantIficatiOn for ComputationAl modeLs *The conference was canceled due to the COVID-19 pandemic. Computational Biomechanics of the Heart and Vasculature with Potential Clinical and Surgical Applications Frontiers Media SA Fluid Transients in Pipeline Systems A Guide to the Control and Suppression of Fluid Transients in Liquids in Closed Conduits John Wiley & Sons This second edition of a well established and highly regarded text has been comprehensively refined and updated, based on the author's experience and feedback from using the original edition during the years

since its first publication in the early 1990's. Modelling of Mechanical Systems: Fluid-Structure Interaction Elsevier Written by an eminent authority in the field, Modelling of Mechanical Systems: Fluid-Structure Interaction is the third in a series of four self-contained volumes suitable for practitioners, academics and students alike in engineering, physical sciences and applied mechanics. The series skilfully weaves a theoretical and pragmatic approach to modelling mechanical systems and to analysing the responses of these systems. The study of fluid-structure interactions in this third volume covers the coupled dynamics of solids and fluids, restricted to the case of oscillatory motions about a state of static equilibrium. Physical and mathematical aspects of modelling these mechanisms are described in depth and illustrated by numerous worked out exercises. · Written by a world authority in the field in a clear, concise and accessible style · Comprehensive coverage of mathematical techniques used to perform computer-based analytical studies and numerical simulations · A key reference for mechanical engineers, researchers and graduate students The Finite Element Method for Three-Dimensional Thermomechanical Applications John Wiley & Sons Though many 'finite element' books exist, this book provides a unique focus on developing the method for three-dimensional, industrial problems. This is significant as many methods which work well for small applications fail for large scale problems, which generally: are not so well posed introduce stringent computer time conditions require robust solution techniques. Starting from sound continuum mechanics principles, derivation in this book focuses only on proven methods. Coverage of all different aspects of linear and nonlinear thermal mechanical problems in solids are described, thereby avoiding distracting the reader with extraneous solutions paths. Emphasis is put on consistent representation and includes the examination of topics which are not frequently found in other texts, such as cyclic symmetry, rigid body motion and nonlinear multiple point constraints. Advanced material formulations include anisotropic hyperelasticity, large strain multiplicative viscoplasticity and single crystal viscoplasticity. Finally, the methods described in the book are implemented in the finite element software CalculiX, which is freely available (www.calculix.de; the GNU General Public License applies). Suited to industry practitioners and academic researchers alike, The Finite Element Method for Three-Dimensional Thermomechanical Applications expertly bridges the gap between continuum mechanics and the finite element method. An Introduction to the Mechanics of Fluids Springer Science & Business Media A compact, moderately general book which encompasses many fluid models of current interest...The book is written very clearly and contains a large number of exercises and their solutions. The level of mathematics is that commonly taught to undergraduates in mathematics departments.. —Mathematical Reviews The book should be useful for graduates and researchers not only in applied mathematics and mechanical engineering but also in advanced materials science and technology...Each public

scientific library as well as hydrodynamics hand libraries should own this timeless book...Everyone who decides to buy this book can be sure to have bought a classic of science and the heritage of an outstanding scientist. —Silikáty All applied mathematicians, mechanical engineers, aerospace engineers, and engineering mechanics graduates and researchers will find the book an essential reading resource for fluids. —Simulation News Europe The Finite Volume Method in Computational Fluid Dynamics An Advanced Introduction with OpenFOAM® and Matlab Springer This textbook explores both the theoretical foundation of the Finite Volume Method (FVM) and its applications in Computational Fluid Dynamics (CFD). Readers will discover a thorough explanation of the FVM numerics and algorithms used for the simulation of incompressible and compressible fluid flows, along with a detailed examination of the components needed for the development of a collocated unstructured pressure-based CFD solver. Two particular CFD codes are explored. The first is uFVM, a three-dimensional unstructured pressure-based finite volume academic CFD code, implemented within Matlab. The second is OpenFOAM®, an open source framework used in the development of a range of CFD programs for the simulation of industrial scale flow problems. With over 220 figures, numerous examples and more than one hundred exercise on FVM numerics, programming, and applications, this textbook is suitable for use in an introductory course on the FVM, in an advanced course on numerics, and as a reference for CFD programmers and researchers. International Workshop on Fluid-Structure Interaction. Theory, Numerics and Applications kassel university press GmbH Verification and Validation in Computational Science and Engineering Hermosa Pub Flow-induced Vibration of Power and Process Plant Components A Practical Workbook Amer Society of Mechanical Information on the most common flow-induced vibration problems in power and process plant components. Based on the author's own experience that most errors in engineering analysis come from confusions in the units, the author begins with a short chapter on units and dimensions. He then provides step-by-step examples in dual US and SI units, leading to the final objective of design analysis, problem solving, diagnosis and trouble shooting. Liquid Sloshing Dynamics Theory and Applications Cambridge University Press The problem of liquid sloshing in moving or stationary containers remains of great concern to aerospace, civil, and nuclear engineers; physicists; designers of road tankers and ship tankers; and mathematicians. Beginning with the fundamentals of liquid sloshing theory, this book takes the reader systematically from basic theory to advanced analytical and experimental results in a self-contained and coherent format. The book is divided into four sections. Part I deals with the theory of linear liquid sloshing dynamics; Part II addresses the nonlinear theory of liquid sloshing dynamics, Faraday waves, and sloshing impacts; Part III presents the problem of linear and nonlinear interaction of liquid sloshing dynamics with elastic containers and supported structures; and Part IV considers the fluid dynamics in spinning containers and

microgravity sloshing. This book will be invaluable to researchers and graduate students in mechanical and aeronautical engineering, designers of liquid containers, and applied mathematicians. Modern Fluid Dynamics, Second Edition CRC Press Modern Fluid Dynamics, Second Edition provides up-to-date coverage of intermediate and advanced fluids topics. The text emphasizes fundamentals and applications, supported by worked examples and case studies. Scale analysis, non-Newtonian fluid flow, surface coating, convection heat transfer, lubrication, fluid-particle dynamics, microfluidics, entropy generation, and fluid-structure interactions are among the topics covered. Part A presents fluids principles, and prepares readers for the applications of fluid dynamics covered in Part B, which includes computer simulations and project writing. A review of the engineering math needed for fluid dynamics is included in an appendix. Applied Mechanics Reviews Government Reports Announcements & Index Fluid Structure Interaction II Modelling, Simulation, Optimization Springer Science & Business Media Fluid-structure interactions (FSI), i.e., the interplay of some moveable or deformable structure with an internal or surrounding fluid, are among the most widespread and most challenging coupled or multi-physics problems. Although much has been accomplished in developing good computational FSI methods and despite convincing solutions to a number of classes of problems including those presented in this book, there is a need for more comprehensive studies showing that the computational methods proposed are reliable, robust, and efficient beyond the classes of problems they have successfully been applied to.This volume of LNCSE, a sequel to vol. 53, which contained, among others, the first numerical benchmark for FSI problems and has received considerable attention since then, presents a collection of papers from the "First International Workshop on Computational Engineering - special focus FSI," held in Herrsching in October 2009 and organized by three DFG-funded consortia. The papers address all relevant aspects of FSI simulation and discuss FSI from the mathematical, informatical, and engineering perspective. Shock Wave-Boundary-Layer Interactions Cambridge University Press Shock wave-boundary-layer interaction (SBLI) is a fundamental phenomenon in gas dynamics that is observed in many practical situations, ranging from transonic aircraft wings to hypersonic vehicles and engines. SBLIs have the potential to pose serious problems in a flowfield; hence they often prove to be a critical - or even design limiting - issue for many aerospace applications. This is the first book devoted solely to a comprehensive, state-of-the-art explanation of this phenomenon. It includes a description of the basic fluid mechanics of SBLIs plus contributions from leading international experts who share their insight into their physics and the impact they have in practical flow situations. This book is for practitioners and graduate students in aerodynamics who wish to familiarize themselves with all aspects of SBLI flows. It is a valuable resource for specialists because it compiles experimental, computational and theoretical knowledge in one place. Advances in Heart Valve Biomechanics Valvular

Physiology, Mechanobiology, and Bioengineering Springer This book covers the latest research development in heart valve biomechanics and bioengineering, with an emphasis on novel experimentation, computational simulation, and applications in heart valve bioengineering. The most current research accomplishments are covered in detail, including novel concepts in valvular viscoelasticity, fibril/molecular mechanisms of tissue behavior, fibril kinematics-based constitutive models, mechano-interaction of valvular interstitial and endothelial cells, biomechanical behavior of acellular valves and tissue engineered valves, novel bioreactor designs, biomechanics of transcatheter valves, and 3D heart valve printing. This is an ideal book for biomedical engineers, biomechanics, surgeons, clinicians, business managers in the biomedical industry, graduate and undergraduate students studying biomedical engineering, and medical students. Handbook of Wind Energy Aerodynamics Springer Nature This handbook provides both a comprehensive overview and deep insights on the state-of-the-art methods used in wind turbine aerodynamics, as well as their advantages and limits. The focus of this work is specifically on wind turbines, where the aerodynamics are different from that of other fields due to the turbulent wind fields they face and the resultant differences in structural requirements. It gives a complete picture of research in the field, taking into account the different approaches which are applied. This book would be useful to professionals, academics, researchers and students working in the field. Monthly Catalogue, United States Public Documents Petroleum Abstracts. Literature and Patents Applied Mathematics: Body and Soul Calculus in Several Dimensions Springer Science & Business Media Applied Mathematics: Body & Soul is a mathematics education reform project developed at Chalmers University of Technology and includes a series of volumes and software. The program is motivated by the computer revolution opening new possibilitites of computational mathematical modeling in mathematics, science and engineering. It consists of a synthesis of Mathematical Analysis (Soul), Numerical Computation (Body) and Application. Volumes I-III present a modern version of Calculus and Linear Algebra, including constructive/numerical techniques and applications intended for undergraduate programs in engineering and science. Further volumes present topics such as Dynamical Systems, Fluid Dynamics, Solid Mechanics and Electro-Magnetics on an advanced undergraduate/graduate level. The authors are leading researchers in Computational Mathematics who have written various successful books. Fluid-Structure Interactions Cross-Flow-Induced Instabilities Cambridge University Press Structures in contact with fluid flow, whether natural or man-made, are inevitably subject to flow-induced forces and flow-induced vibration: from plant leaves to traffic signs and to more substantial structures, such as bridge decks and heat exchanger tubes. Under certain conditions the vibration may be self-excited, and it is usually referred to as an instability. These instabilities and, more specifically, the conditions under which they arise are of great importance

to designers and operators of the systems concerned because of the significant potential to cause damage in the short term. Such flow-induced instabilities are the subject of this book. In particular, the flow-induced instabilities treated in this book are associated with cross-flow, that is, flow normal to the long axis of the structure. The book treats a specific set of problems that are fundamentally and technologically important: galloping, vortex-shedding oscillations under lock-in conditions and rain-and-wind-induced vibrations, among others. Fundamental Trends in Fluid-structure Interaction World Scientific The interaction of a fluid with a solid body is a widespread phenomenon in nature, occurring at different scales and different applied disciplines. Interestingly enough, even though the mathematical theory of the motion of bodies in a liquid is one of the oldest and most classical problems in fluid mechanics, mathematicians have, only very recently, become interested in a systematic study of the basic problems related to fluid-structure interaction, from both analytical and numerical viewpoints. Fundamental Trends in Fluid-Structure Interaction is a unique collection of important papers written by world-renowned experts aimed at furnishing the highest level of development in several significant areas of fluid-structure interactions. The contributions cover several aspects of this discipline, from mathematical analysis, numerical simulation and modeling viewpoints, including motion of rigid and elastic bodies in a viscous liquid, particulate flow and hemodynamic.