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to understand the concepts. Pseudo-code throughout makes the link between theory and algorithms, and the actual implementation. Accompanied by a website (www.wiley.com/go/deborst) with a Python code, based on the pseudo-code within the book and suitable for solving small-size problems. Non-linear Finite Element Analysis of Solids and Structures, 2nd Edition is an essential reference for practising engineers and researchers that can also be used as a text for undergraduate and graduate students within computational mechanics.

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This book offers an in-depth presentation of the finite element method, aimed at engineers, students and researchers in applied sciences. The description of the method is presented in such a way as to be usable in any domain of application. The level of mathematical expertise required is limited to differential and matrix calculus. The various stages necessary for the implementation of the method are clearly identified, with a chapter given over to each one: approximation, construction of the integral forms, matrix organization, solution of the algebraic systems and architecture of programs. The final chapter lays the foundations for a general program, written in Matlab, which can be used to solve problems that are linear or otherwise, stationary or transient,

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presented in relation to applications stemming from the domains of structural mechanics, fluid mechanics and heat transfer.

The functionality of modern structural, mechanical and electrical or electronic systems depends on their ability to perform under uncertain conditions. Consideration of uncertainties and their effect on system behavior is an essential and integral part of defining systems. In eleven chapters, leading experts present an overview of the current state of uncertainty modeling, analysis and design of large systems in four major areas: finite and boundary element methods (common structural analysis techniques), fatigue, stability analysis, and fault-tolerant systems. The content of

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this book is unique; it describes exciting research developments and challenges in emerging areas, and provide a sophisticated toolbox for tackling uncertainty modeling in real systems. Contents: Probabilistic Finite Element Analysis of Large Structural Systems (S Mahadevan) Reliability Evaluation of Structures Using Nonlinear SFEM (A Haldar & L-W Gao) Finite Element Method for Stochastic Structures Based on Inverse of Stiffness Matrix (I Elishakoff & Y-J Ren) The Weighted Integral Method and the Variability Response Function as Part of an SFEM Formulation (G Deodatis & L Graham) Response of a Vibrating Structure to Turbulent Wall Pressure: Fluid-Loaded Structure Modes Series and Boundary Element Method (P J T Filippi & D Mazzone) Reliability-Based Structural Fatigue Damage

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these areas. It is designed for readers who are familiar with the fundamentals and wish to study a particular topic or use the book as an authoritative reference. Mathematical Reviews

Mathematics of Computing -- Parallelism.

While the theory and application of finite elements methods can be extended to incompatible, hybrid, and mixed element methods, important issues, such as determining the reliability of the solution of incompatible multivariable elements, along with a common perception of impracticality, have hindered the widespread implementation of these methods. Today, however, recent advances--many directly attributable to these

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authors--have allowed the development of the stability theory and abstract mathematics to useful tools. Hybrid and Incompatible Finite Element Methods introduces these advances in the theory and applications of incompatible and multivariable finite element methods. After an overview of the variation formulation of finite element methods in solid mechanics, the authors discuss the fundamental theory and systematically demonstrate the theoretical foundations of incompatible elements and their application to different problems in the theory of elasticity. They also introduce new ideas in the development of hybrid finite elements, study the numerical stability of the hybrid and mixed element, and establish the theory of zero energy deformation modes. The final chapters, explore applications to fracture problems,

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present a bound analysis for fracture parameters, and demonstrate an implementation of a finite element analysis program.

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