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## BRIGGS PIERRE

**The Computer Aided Engineering Design Series** Springer  
Experimental and Applied Mechanics, Volume 4 of the Proceedings of the 2016 SEM Annual Conference & Exposition on Experimental and Applied Mechanics, the fourth volume of ten from the Conference, brings together contributions to important areas of research and engineering. The collection presents early findings and case studies on a wide range of topics, including: Hybrid Experimental & Computational Techniques Advanced Experimental Mechanics Methods Integration of Models & Experiments Soft Materials Education & Research in Progress Applications  
Proceedings of the 2016 Annual Conference on Experimental and Applied Mechanics Springer  
The aim of this thesis is the simulation of progressive damage in brittle materials due to cracking. With this aim, the mathematical crack model will be solved using the eXtended Finite Element Method for the spatial discretization and time integration schemes for the numerical integration in the time domain. The time integration schemes considered are the Generalized- $\alpha$  method, the continuous GALERKIN method and the discontinuous GALERKIN method.

*Ageing and Durability of Epoxies and Polyurethanes* Wiley-VCH  
These recommendations present general methods for the assessment of fatigue damage in welded components, which may affect the limit states of a structure, such as ultimate limit state and serviceability limited state. Fatigue resistance data is given for welded components made of wrought or extruded products of ferritic/pearlitic or bainitic structural steels up to  $f_y = 700$  Mpa and

of aluminium alloys commonly used for welded structures.

**Lectures of the CMM 2009** Elsevier

Evolutionary Topology Optimization of Continuum Structures treads new ground with a comprehensive study on the techniques and applications of evolutionary structural optimization (ESO) and its later version bi-directional ESO (BESO) methods. Since the ESO method was first introduced by Xie and Steven in 1992 and the publication of their well-known book Evolutionary Structural Optimization in 1997, there have been significant improvements in the techniques as well as important practical applications. The authors present these developments, illustrated by numerous interesting and detailed examples. They clearly demonstrate that the evolutionary structural optimization method is an effective approach capable of solving a wide range of topology optimization problems, including structures with geometrical and material nonlinearities, energy absorbing devices, periodical structures, bridges and buildings. Presents latest developments and applications in this increasingly popular & maturing optimization approach for engineers and architects; Authored by leading researchers in the field who have been working in the area of ESO and BESO developments since their conception; Includes a number of test problems for students as well as a chapter of case studies that includes several recent practical projects in which the authors have been involved; Accompanied by a website housing ESO/BESO computer programs at <http://www.wiley.com/go/huang> and test examples, as well as a chapter within the book giving a description and step-by-step instruction on how to use the software package BESO2D. Evolutionary Topology Optimization of Continuum Structures will appeal to researchers and graduate students working in structural design and optimization, and will also be of interest to civil and structural engineers, architects and mechanical engineers

involved in creating innovative and efficient structures.

*Liquid Crystal Elastomers* Wiley-ISTE

This book comprises selected proceedings of the Fourth International Conference in Ocean Engineering (ICOE2018), focusing on emerging opportunities and challenges in the field of ocean engineering and offshore structures. It includes state-of-the-art content from leading international experts, making it a valuable resource for researchers and practicing engineers alike.

**Finite Element Applications** Product Performance Evaluation using CAD/CAE The Computer Aided Engineering Design Series The first book to present current methods and techniques of fatigue analysis, with a focus on developing basic skills for selecting appropriate analytical techniques. Contains numerous worked examples, chapter summaries, and problems. (vs. Fuchs/Stevens).

*A Practical Guide to the FEM Process* Springer Science & Business Media

This book provides the first truly comprehensive study of damage mechanics. All concepts are carefully identified and defined in micro- and macroscopic scales. In terms of the methods and observation scales, the main part of the book is divided into three chapters. These chapters consider the stochastic models applied to atomistic scale, micromechanical models (for arbitrary concentrations of defects) on microscopic scale and continuum models on the macroscopic scale. It is intended for people who are doing or planning to do research in the mechanics and material science aspects of brittle deformation of solids with heterogeneous microstructure.

*FFW 2021, August 2-3, Ghent University, Belgium* Springer  
Theory of Elasticity and Stress Concentration Yukiitaka Murakami, Kyushu University, Japan A comprehensive guide to elasticity and stress concentration Theory of Elasticity and Stress Concentration

comprehensively covers elasticity and stress concentration and demonstrates how to apply the theory to practical engineering problems. The book presents a new approach to the topic without the need for complicated mathematics, and the principles and meaning of stress concentration are covered without reliance on numerical analysis. The book consists of two parts: Part I - Theory of Elasticity and Part II - Stress Concentration. Part I treats the theory of elasticity from the viewpoint of helping the reader to comprehend the essence of it. Part II treats the principle and meaning of stress concentration and guides the reader to a better understanding of it. Throughout the book, many useful and interesting applications of the basic new way of thinking are presented and explained. Key features: Unique approach to the topics. Encourages the readers to acquire the new way of thinking and engineering judgement. Includes examples, problems and solutions. This book provides essential reading for researchers and practitioners in the structural and mechanical engineering industries.

**Fracture Mechanics** Oxford University Press

A comprehensive overview of adhesive bonding, providing both basic knowledge of polymer adhesives as well as insights into their mechanical and ageing properties. The book is unique in its up-to-date, self-contained summary of recent developments and in its integration of the theory, synthesis and mechanical properties of adhesive joints as well as their applications. Well-structured throughout, the first chapter introduces the initial state of adhesive joints and their formation, while subsequent chapters discuss the ageing and failure as well as the weathering of adhesive joints. In addition the issue of long-term behavior and lifetime predictions are considered. The text is rounded off by a look at future technological advances. The result is an essential reference for a wide range of disciplines

**Volume 2** John Wiley & Sons

Novel techniques for modeling 3D cracks and their evolution in solids are presented. Cracks are modeled in terms of signed distance functions (level sets). Stress, strain and displacement field are determined using the extended finite elements method (X-FEM). Non-linear constitutive behavior for the crack tip region are developed within this framework to account for non-linear effect in crack propagation. Applications for static or dynamics case are provided.

*Evolutionary Topology Optimization of Continuum Structures* Academic Press

Fracture mechanics has established itself as an important discipline of growing interest to those working to assess the safety, reliability and service life of engineering structures and materials. In order to calculate the loading situation at cracks and defects, nowadays numerical techniques like finite element method (FEM) have become indispensable tools for a broad range of applications. The present monograph provides an introduction to the essential concepts of fracture mechanics, its main goal being to procure the special techniques for FEM analysis of crack problems, which have to date only been mastered by experts. All kinds of static, dynamic and fatigue fracture problems are treated in two- and three-dimensional elastic and plastic structural components. The usage of the various solution techniques is demonstrated by means of sample problems selected from practical engineering case studies. The primary target group includes graduate students, researchers in academia and engineers in practice.

*Rock Fracture Mechanics* John Wiley & Sons

e-Design: Computer-Aided Engineering Design, Revised First Edition is the first book to integrate a discussion of computer design tools throughout the design process. Through the use of this book, the reader will understand basic design principles and all-digital design paradigms, the CAD/CAE/CAM tools available for various design related tasks, how to put an integrated system together to conduct All-Digital Design (ADD), industrial practices in employing ADD, and tools for product development.

Comprehensive coverage of essential elements for understanding and practicing the e-Design paradigm in support of product design, including design method and process, and computer based tools and technology Part I: Product Design Modeling discusses virtual mockup of the product created in the CAD environment, including not only solid modeling and assembly theories, but also the critical design parameterization that converts the product solid model into parametric representation, enabling the search for better design alternatives Part II: Product Performance Evaluation focuses on applying CAE technologies and software tools to support evaluation of product performance, including structural analysis, fatigue and fracture, rigid body kinematics and dynamics, and failure probability prediction and

reliability analysis Part III: Product Manufacturing and Cost Estimating introduces CAM technology to support manufacturing simulations and process planning, sheet forming simulation, RP technology and computer numerical control (CNC) machining for fast product prototyping, as well as manufacturing cost estimate that can be incorporated into product cost calculations Part IV: Design Theory and Methods discusses modern decision-making theory and the application of the theory to engineering design, introduces the mainstream design optimization methods for both single and multi-objectives problems through both batch and interactive design modes, and provides a brief discussion on sensitivity analysis, which is essential for designs using gradient-based approaches Tutorial lessons and case studies are offered for readers to gain hands-on experiences in practicing e-Design paradigm using two suites of engineering software: Pro/ENGINEER-based, including Pro/MECHANICA Structure, Pro/ENGINEER Mechanism Design, and Pro/MFG; and SolidWorks-based, including SolidWorks Simulation, SolidWorks Motion, and CAMWorks. Available on the companion website <http://booksite.elsevier.com/9780123820389>

*Damage Mechanics* Springer

This text is a primer for liquid crystals, polymers, rubber and elasticity. It is directed at physicists, chemists, material scientists, engineers and applied mathematicians at the graduate student level and beyond.

**Experimental and Applied Mechanics, Volume 4** Gulf Professional Publishing

Introduces the theory and applications of the extended finite element method (XFEM) in the linear and nonlinear problems of continua, structures and geomechanics Extended Finite Element Method: Theory and Applications introduces the theory and applications of the extended finite element method (XFEM) in the linear and nonlinear problems of continua, structures and geomechanics. The XFEM approach is based on an extension of standard finite element method based on the partition of unity method. Extended Finite Element Method: Theory and Applications begins by introducing the concept of partition of unity, various enrichment functions, and fundamentals of XFEM formulation. It then covers the theory and application of XFEM in large deformations, plasticity and contact problems. The implementation of XFEM in fracture mechanics, including the

linear, cohesive, and ductile crack propagation is also covered. The theory and applications of the XFEM in multiphase fluid flow, including the hydraulic fracturing in soil saturated media and crack propagation in thermo-hydro-mechanical porous media, is also discussed in detail. Introduces the theory and applications of the extended finite element method (XFEM) in the linear and nonlinear problems of continua, structures and geomechanics. Explores the concept of partition of unity, various enrichment functions, and fundamentals of XFEM formulation. Covers numerous applications of XFEM including fracture mechanics, large deformation, plasticity, multiphase flow, hydraulic fracturing and contact problems. Accompanied by a website hosting source code and examples.

*Fracture, Fatigue, Failure and Damage Evolution, Volume 6* John Wiley & Sons

This important textbook provides an introduction to the concepts of the newly developed extended finite element method (XFEM) for fracture analysis of structures, as well as for other related engineering applications. One of the main advantages of the method is that it avoids any need for remeshing or geometric crack modelling in numerical simulation, while generating discontinuous fields along a crack and around its tip. The second major advantage of the method is that by a small increase in number of degrees of freedom, far more accurate solutions can be obtained. The method has recently been extended to nonlinear materials and other disciplines such as modelling contact and interface, simulation of inclusions and holes, moving and changing phase problems, and even to multiscale analyses. The book is self contained, with summaries of both classical and modern computational techniques. The main chapters include a comprehensive range of numerical examples describing various features of XFEM.

*With Application in Structural Engineering Analysis* Springer  
Product Performance Evaluation using CAD/CAE The Computer Aided Engineering Design Series Academic Press

**Theory - Numerics - Applications** John Wiley & Sons

This book deals with metal processing and its numerical modelling and simulation. In total, 21 papers from different distinguished authors have been compiled in this area. Various processes are

addressed, including solidification, TIG welding, additive manufacturing, hot and cold rolling, deep drawing, pipe deformation, and galvanizing. Material models are developed at different length scales from atomistic simulation to finite element analysis in order to describe the evolution and behavior of materials during thermal and thermomechanical treatment. Materials under consideration are carbon, Q&T, DP, and stainless steels; ductile iron; and aluminum, nickel-based, and titanium alloys. The developed models and simulations shall help to predict structure evolution, damage, and service behavior of advanced materials.

*Fatigue Crack Growth Under Variable Amplitude Loading* John Wiley & Sons

This is one book of a four-part series, which aims to integrate discussion of modern engineering design principles, advanced design tools, and industrial design practices throughout the design process. Through this series, the reader will: Understand basic design principles and modern engineering design paradigms. Understand CAD/CAE/CAM tools available for various design related tasks. Understand how to put an integrated system together to conduct product design using the paradigms and tools. Understand industrial practices in employing virtual engineering design and tools for product development. Provides a comprehensive and thorough coverage on essential elements for product performance evaluation using the virtual engineering paradigms. Covers CAD/CAE in Structural Analysis using FEM, Motion Analysis of Mechanical Systems, Fatigue and Fracture Analysis. Each chapter includes both analytical methods and computer-aided design methods, reflecting the use of modern computational tools in engineering design and practice. A case study and tutorial example at the end of each chapter provide hands-on practice in implementing off-the-shelf computer design tools. Provides two projects at the end of the book showing the use of Pro/ENGINEER® and SolidWorks® to implement concepts discussed in the book.

**Damage Mechanics** Springer Science & Business Media

There are some books that target the theory of the finite element, while others focus on the programming side of things. Introduction to Finite Element Analysis Using MATLAB® and Abaqus accomplishes both. This book teaches the first principles

of the finite element method. It presents the theory of the finite element method while maintaining a balance between its mathematical formulation, programming implementation, and application using commercial software. The computer implementation is carried out using MATLAB, while the practical applications are carried out in both MATLAB and Abaqus. MATLAB is a high-level language specially designed for dealing with matrices, making it particularly suited for programming the finite element method, while Abaqus is a suite of commercial finite element software. Includes more than 100 tables, photographs, and figures. Provides MATLAB codes to generate contour plots for sample results. Introduction to Finite Element Analysis Using MATLAB and Abaqus introduces and explains theory in each chapter, and provides corresponding examples. It offers introductory notes and provides matrix structural analysis for trusses, beams, and frames. The book examines the theories of stress and strain and the relationships between them. The author then covers weighted residual methods and finite element approximation and numerical integration. He presents the finite element formulation for plane stress/strain problems, introduces axisymmetric problems, and highlights the theory of plates. The text supplies step-by-step procedures for solving problems with Abaqus interactive and keyword editions. The described procedures are implemented as MATLAB codes and Abaqus files can be found on the CRC Press website.

*Fracture Mechanics* Pearson College Division

A comprehensive overview of adhesive bonding, providing both basic knowledge of polymer adhesives as well as insights into their mechanical and ageing properties. The book is unique in its up-to-date, self-contained summary of recent developments and in its integration of the theory, synthesis and mechanical properties of adhesive joints as well as their applications. Well-structured throughout, the first chapter introduces the initial state of adhesive joints and their formation, while subsequent chapters discuss the ageing and failure as well as the weathering of adhesive joints. In addition the issue of long-term behavior and lifetime predictions are considered. The text is rounded off by a look at future technological advances. The result is an essential reference for a wide range of disciplines.