Explicit Coupled Thermo Mechanical Finite Element

Statistical and Computational Techniques in Manufacturing
Peridynamic Theory and Its Applications
Advances in Materials Processing
Recent Trends in Mechanical Engineering
Finite Element Simulation of Dynamic Failure Under Fully Plane Strain Loading Conditions
TMS 2011 140th Annual Meeting and Exhibition, General Paper Selections
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Adaptive Analysis of Damage and Fracture in Rock with Multiphysical Fields Coupling
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Hot Stamping Advanced Manufacturing Technology of Lightweight Car Body
Reactor Fuels, Materials and Systems under Extreme Environments
Thermo-mechanical Fatigue Using the Extended Space-time Finite Element Method
TEMP-STRESS---A Thermomechanical Finite

Element Program for the Analysis of Plane and Axisymmetric Reinforced/prestressed Concrete Structures
Micro/Nano Manufacturing
Numerical Continuum Mechanics
Manufacturing Engineering and Materials Handling--2005
Advanced High Strength Steel And Press Hardening - Proceedings Of The 3rd International Conference On Advanced High Strength Steel And Press Hardening (Ichsu2016)
Machining of Hard Materials
Light Metals 2012
Micromanufacturing of Metallic Materials
The Finite Element Method in Heat Transfer Analysis
A Fully Coupled Thermal-mechanical-fluid Flow Model for Nonlinear Geologic Systems
Current Advances in Mechanical Design & Production III
Advances in Computational Methods in Manufacturing
Materials Science and Information Technology
Lasers Based Manufacturing
Heat Transfer XIV
International Conference on Mathematical Sciences and Statistics 2013
Scientific and Technical Aerospace Reports
Materials Processing Handbook
Fundamentals of Modeling for Metals Processing
ASM Handbook
4th International Symposium on High-

Temperature Metallurgical Processing
Extending the Novel A-FEM to Model Arbitrary Cracking in Thermo-elastic Solids
Troubleshooting Finite-Element Modeling with Abaqus
Coupled Thermo-Hydro-Mechanical Processes of Fractured Media
Mechatronics 4.0

ANTONIO YANG

Statistical and Computational Techniques in Manufacturing Springer This book summarizes the advanced manufacturing technology of original innovations in hot stamping of lightweight car body. A detailed description of the technical system and basic knowledge of sheet metal forming is given, which helps readers quickly understand the relevant knowledge in the field. Emphasis has been placed on the independently developed hot stamping process and equipment, which help describe the theoretical and experimental research on key problems involving stress field, thermal field and phase transformation field in hot stamping process. Also, a description of the formability at elevated temperature and the numerical simulation algorithms for high strength steel hot

stamping is given in combination with the experiments. Finally, the book presents some application cases of hot stamping technology such as the lightweight car body design using hot stamping components and gradient hardness components, and the cooling design of the stamping tool. This book is intended for researchers, engineers and graduate students in vehicle engineering, mechanical engineering, especially in the field of advanced manufacturing technology. The book also provides a useful reference for other new technology related temperature and phase transformation, such as aluminum-magnesium alloy hot stamping.

Peridynamic Theory and Its Applications

Springer Nature

The field of materials science and engineering is rapidly evolving into a science of its own. While traditional literature in this area often concentrates primarily on property and structure, the Materials Processing Handbook provides a much needed examination from the materials processing perspective. This unique focus reflects the changing comple

Advances in Materials Processing

Springer Nature

Hard machining is a relatively recent technology that can be defined as a machining operation, using tools with geometrically defined cutting edges, of a work piece that has hardness values typically in the

45-70HRc range. This operation always presents the challenge of selecting a cutting tool insert that facilitates high-precision machining of the component, but it presents several advantages when compared with the traditional methodology based in finish grinding operations after heat treatment of work pieces. Machining of Hard Materials aims to provide the reader with the fundamentals and recent advances in the field of hard machining of materials. All the chapters are written by international experts in this important field of research. They cover topics such as: • advanced cutting tools for the machining of hard materials; • the mechanics of cutting and chip formation; • surface integrity; • modelling and simulation; and • computational methods and optimization. Machining of Hard Materials can serve as a useful reference for academics, manufacturing and materials researchers, manufacturing and mechanical engineers, and professionals in machining and related industries. It can also be used as a text for advanced undergraduate or postgraduate students studying mechanical engineering, manufacturing, or materials.

Recent Trends in Mechanical Engineering Springer This book presents the peridynamic theory, which provides the

capability for improved modeling of progressive failure in materials and structures, and paves the way for addressing multi-physics and multi-scale problems. The book provides students and researchers with a theoretical and practical knowledge of the peridynamic theory and the skills required to analyze engineering problems. The text may be used in courses such as Multi-physics and Multi-scale Analysis, Nonlocal Computational Mechanics, and Computational Damage Prediction. Sample algorithms for the solution of benchmark problems are available so that the reader can modify these algorithms, and develop their own solution algorithms for specific problems. Students and researchers will find this book an essential and invaluable reference on the topic.

Finite Element Simulation of Dynamic Failure Under Fully Plane Strain Loading Conditions CRC Press

An update of the definitive annual reference source in the field of aluminum production and related light metals technologies, a great mix of materials science and practical, applied technology surrounding aluminum, bauxite, aluminum reduction, rolling, casting, and production.

TMS 2011 140th Annual Meeting and Exhibition, General Paper Selections World Scientific

Heat transfer analysis is a problem of major significance in a vast range of industrial applications. These extend over the fields of mechanical engineering, aeronautical engineering, chemical engineering and numerous applications in civil and electrical engineering. If one considers the heat conduction equation alone the number of practical problems amenable to solution is extensive. Expansion of the work to include features such as phase change, coupled heat and mass transfer, and thermal stress analysis provides the engineer with the capability to address a further series of key engineering problems. The complexity of practical problems is such that closed form solutions are not generally possible. The use of numerical techniques to solve such problems is therefore considered essential, and this book presents the use of the powerful finite element method in heat transfer analysis. Starting with the fundamental general heat conduction equation, the book moves on to consider the solution of linear steady state heat conduction problems, transient analyses and non-linear examples. Problems of melting and solidification are then considered at length followed by a chapter on convection. The application of heat and mass transfer to drying problems and the calculation of both thermal and shrinkage

stresses conclude the book. Numerical examples are used to illustrate the basic concepts introduced. This book is the outcome of the teaching and research experience of the authors over a period of more than 20 years. Advances in Structural Integrity Springer Nature
In recent years, interest in developing statistical and computational techniques for applied manufacturing engineering has been increased. Today, due to the great complexity of manufacturing engineering and the high number of parameters used, conventional approaches are no longer sufficient. Therefore, in manufacturing, statistical and computational techniques have achieved several applications, namely, modelling and simulation manufacturing processes, optimization manufacturing parameters, monitoring and control, computer-aided process planning, etc. The present book aims to provide recent information on statistical and computational techniques applied in manufacturing engineering. The content is suitable for final undergraduate engineering courses or as a subject on manufacturing at the postgraduate level. This book serves as a useful reference for academics, statistical and computational

science researchers, mechanical, manufacturing and industrial engineers, and professionals in industries related to manufacturing engineering.
Computational Science – ICCS 2022 WIT Press
This volume presents a selection of papers from the 2nd International Conference on Computational Methods in Manufacturing (ICCMM 2019). The papers cover the recent advances in computational methods for simulating various manufacturing processes like machining, laser welding, laser bending, strip rolling, surface characterization and measurement. Articles in this volume discuss both the development of new methods and the application and efficacy of existing computational methods in manufacturing sector. This volume will be of interest to researchers in both industry and academia working on computational methods in manufacturing.
TMS 2020 149th Annual Meeting & Exhibition Supplemental Proceedings Light Metals 2012
This book gathers original findings, both theoretical and experimental, related to various cutting-edge topics in the design and modeling of mechatronic systems, including multiphysics problems. It presents peer-reviewed papers from the first installment of the

Mechatronics 4.0 workshop, which was jointly organized by the Laboratory of Mechanics, Modeling and Manufacturing (LA2MP), National School of Engineers of Sfax, Tunisia, and the QUARTZ Laboratory, Higher Institute of Mechanics of Paris, SUPMECA, France. The event follows in the tradition of the Workshop on Mechatronic Systems (JSM2014), organized by the same universities, while shifting the focus to the concept of Industry 4.0. As this new type of industry is emerging as the convergence of the virtual world, digital design, and management with real-world products and objects, the chapters gathered here highlight recent work on mechatronics systems that are expected to help shape the industry of tomorrow. Thanks to a healthy balance of theory and practical findings, the book offers a timely snapshot for the research and industrial communities alike, as well as a bridge to facilitate communication and collaboration between the two groups.

Adaptive Analysis of Damage and Fracture in Rock with Multiphysical Fields Coupling Elsevier

TEMP-STRESS has been developed to improve the understanding of the behavior of concrete subjected to mechanical loadings and high temperatures simulating the effects of coolant spills, molten debris, etc. The capability to model

concrete structures subjected to static and dynamic overpressures, such as LWR and LMR containments with complex axisymmetric geometries, can be solved. The computer code is a finite element program which has a weakly coupled thermomechanical formulation. It can handle transient and steady state problems through the use of explicit time integration and dynamic relaxation. There is a plane or axisymmetric continuum element and flexural beam and shell elements for concrete discretization. The continuum element is a four node quadrilateral using numerical integration and elastic hourglass control. Variable material properties as a function of temperature are available. Thermal and/or mechanical loading can be handled. The concrete material model has the following characteristics: (a) elastic-plastic response, (b) variable loading surface capability, (c) cracking normal to maximum principal strain at specified failure surface, (d) post-failure element treatment, and (e) variable temperature dependence. Concrete can be reinforced and/or prestressed. 15 refs., 33 figs., 24 tabs.

Implementation of Computer Procedures and Stress-strain Laws in Geotechnical Engineering Springer

These are the fully

refereed proceedings of the International Conference on Materials Science and Information Technology (MSIT 2011), held during the 16-18 September 2011 in Singapore. The main goal of the event was to provide an international scientific forum for the exchange of new ideas in a number of fields by permitting in-depth interaction via discussions with peers from around the world. Core areas of materials science and information technology, plus multi-disciplinary and interdisciplinary aspects are covered. Volume is indexed by Thomson Reuters CPCI-S (WoS).

Hot Stamping Advanced Manufacturing Technology of Lightweight Car Body

Elsevier

This Handbook provides an overview of the development of models of metallic materials and how the materials are affected by processing. This knowledge is central to understanding of the behaviour of existing alloys and the development of new materials that affect nearly every manufacturing industry. Background on fundamental modeling methods provides the user with a solid foundation of the underlying physics that support the mechanistic method of many industrial simulation software packages. The phenomenological method is given equal coverage

Reactor Fuels, Materials and Systems under Extreme Environments Springer Nature
Presents the up-to-date information on the state of materials fromelectronic, magnetic, and photonic materials, light metals,materials processing and manufacturing, and structural materialswhich are of invaluable benefit to the global industry.
Thermo-mechanical Fatigue Using the Extended Space-time Finite Element Method Springer Nature
This book comprises the proceedings of the 3rd Structural Integrity Conference and Exhibition (SICE 2020). The contents of the volume focus on structural integrity, life prediction, and condition monitoring which are reclassified under the domains of aerospace, fracture mechanics, fatigue, creep-fatigue interactions, civil structures, experimental techniques, computation mechanics, structural health monitoring, nondestructive testing, failure analysis, materials processing, stress corrosion cracking, reliability and risk analysis. This book will be a useful reference for students, researchers and practitioners.
TEMP-STRESS---A Thermomechanical Finite Element Program for the Analysis of Plane and Axisymmetric Reinforced/prestressed Concrete

Structures Springer
This work focuses on computational methods in continuum thermomechanics. The text is based on the author's lectures, which ensures a didactical and coherent buildup. The main emphasis is put on the presentation of ideas and qualitative considerations, illustrated by specific examples and applications. Conditions and explanations that are essential for the practical application of methods are discussed thoroughly.
Micro/Nano Manufacturing Springer Nature
This volume is devoted to the most recent discoveries in mathematics and statistics. It also serves as a platform for knowledge and information exchange between experts from industrial and academic sectors. The book covers a wide range of topics, including mathematical analyses, probability, statistics, algebra, geometry, mathematical physics, wave propagation, stochastic processes, ordinary and partial differential equations, boundary value problems, linear operators, cybernetics and number and functional theory. It is a valuable resource for pure and applied mathematicians, statisticians, engineers and scientists.
Numerical Continuum Mechanics MDPI
Light Metals 2012Springer
Manufacturing Engineering and

Materials Handling--2005 Walter de Gruyter Thermomechanical high-cycle fatigue is a major failure mechanism for many engineering components in a diverse range of industries such as aerospace, automotive, and nuclear among others. Engineers trying to determine the fatigue life of a component typically rely on commercial fatigue analysis software which uses traditional fatigue criteria that are limited in their applicability. For instance, they are poor at handling multiaxial and variable amplitude loading. Furthermore, adding variable amplitude thermal loading into the mix makes using these traditional fatigue criteria even less appealing. In recent years, there have been attempts to establish methods for simulating high cycle fatigue based on finite element calculations rather than using it as a post-processing step. These include cohesive zone and continuum damage mechanics models. However, all of these methods employ cycle jumping strategies to cut down on the enormous computational time required. However, cycle jumping is not applicable for a random loading history or with random or out-of-phase temperature variation. Motivated by these current developments, this thesis proposes the use of the extended space-time finite element method

(XTFEM) in combination with a two scale progressive fatigue damage model for the direct numerical simulation of thermomechanical high cycle fatigue. Instead of using the conventional explicit or implicit finite difference time integration methods, temporal approximations are introduced with FEM mesh and enriched based on the extended finite element method. After outlining the basic theory for XTFEM with thermomechanical coupling, the effectiveness of the computational framework is demonstrated in numerical examples including a coupled, thermomechanical fatigue simulation of a plate and hat stiffener model representative of a hypersonic aircraft's structure.

Advanced High Strength Steel And Press Hardening - Proceedings Of The 3rd International Conference On Advanced High Strength Steel And Press Hardening (Ichsu2016) Trans Tech Publications Ltd This work brings together the results, information and data that emerged from an international cooperative project, DECOVALEX, 1992-1995. This project was concerned with the mathematical and experimental studies of coupled thermo(T) -hydro(H) - mechanical(M) processes in fractured media related to radioactive waste disposal. The book

presents, for the first time, the systematic formulation of mathematical models of the coupled T-H-M processes of fractured media, their validation against theoretical bench-mark tests, and experimental studies at both laboratory and field scales. It also presents, for the first time, a comprehensive analysis of continuum, and discrete approaches to the study of the problems of (as well as a complete description of), the computer codes applied to the studies. The first two chapters provide a conceptual introduction to the coupled T-H-M processes in fractured media and the DECOVALEX project. The next seven chapters give a state-of-the-art survey of the constitutive models of rock fractures and formulation of coupled T-H-M phenomena with continuum and discontinuum approaches, and associated numerical methods. A study on the three generic Bench-Mark Test problems and six Test Case problems of laboratory and field experiments are reported in chapters 10 to 18. Chapter 19 contains lessons learned during the project. The research contained in this book will be valuable for designers, practising engineers and national waste management officials who are concerned with planning, design and performance, and safety assessments of radioactive waste

repositories. Researchers and postgraduate students working in this field will also find the book of particular relevance.
Machining of Hard Materials John Wiley & Sons
This book presents selected research papers of the AIMTDR 2014 conference on application of laser technology for various manufacturing processes such as cutting, forming, welding, sintering, cladding and micro-machining. State-of-the-art of these technologies in terms of numerical modeling, experimental studies and industrial case studies are presented. This book will enrich the knowledge of budding technocrats, graduate students of mechanical and manufacturing engineering, and researchers working in this area.