Procast Esi User Manual

This monograph provides a field-proven approach to analyze industrial production with a cross-company scope as w regarding all hierarchical system levels of manufacturing enterprises. The book exemplifies this approach in the cont aluminum die casting, and presents a set of measures which allow a 30 percent energy reduction along the value ch target audience primarily comprises researchers and experts in the field but the book may also be beneficial for grac students.

This book is a printed edition of the Special Issue "Intermetallics 2016" that was published in Metals

This book constitutes the first part of refereed proceedings of the 5th Computational Methods in Systems and Soft (CoMeSySo 2021). The CoMeSySo 2021 Conference is breaking the barriers, being held online. CoMeSySo 2021 inte provide an international forum for the discussion of the latest high-quality research results. The software engineerin computer science, and artificial intelligence are crucial topics for the research within an intelligent systems problem

Computational Methods for Microstructure-Property Relationships introduces state-of-the-art advances in computa modeling approaches for materials structure-property relations. Written with an approach that recognizes the neces the engineering computational mechanics framework, this volume provides balanced treatment of heterogeneous ma structures within the microstructural and component scales. Encompassing both computational mechanics and computational materials science disciplines, this volume offers an analysis of the current techniques and selected to important to industry researchers, such as deformation, creep and fatigue of primarily metallic materials. Researcher engineers and professionals involved with predicting performance and failure of materials will find Computational Me for Microstructure-Property Relationships a valuable reference.

Accelerating Technology Transition

eScience on Distributed Computing Infrastructure

Numerical Modelling and Simulation of Metal Processing

The Finite Element Method: Its Basis and Fundamentals

Directional Solidification of Large Cross-section Ni-base Superalloy Castings Via Liquid-metal Cooling

As one of the results of an ambitious project, this handbook provides a well-structured directory of globally available software tools in the area of Integrated Computational Materials Engineering (ICME). The compilation covers models, software tools, and numerical methods allowing describing electronic, atomistic, and mesoscopic phenomena, which in their combination determine the microstructure and the properties of materials. It reaches out to simulations of component manufacture comprising primary shaping, forming, joining, coating, heat treatment, and machining processes. Models and tools addressing the in-service behavior like fatigue, corrosion, and eventually recycling complete the compilation. An introductory overview is provided for each of these different modelling areas highlighting the relevant phenomena and also discussing the current state for the different simulation approaches. A must-have for researchers, application engineers, and simulation software providers seeking a holistic overview about the current state of the art in a huge variety of modelling topics. This handbook equally serves as a reference manual for academic and commercial software developers and providers, for industrial users of simulation software, and for decision makers seeking to optimize their production by simulations. In view of its sound introductions into the different fields of materials physics, materials chemistry, materials engineering and materials processing it also serves as a tutorial for students in the emerging discipline of ICME, which requires a broad view on things and at least a basic education in adjacent fields.

Selected peer-reviewed extended papers abstracts of which were presented at the 15th conference

"Contribution of Metallography to Production Problem Solutions" Aggregated Book

Бесплатное издание

Innovative Developments in Virtual and Physical Prototyping presents essential research in the area of Virtual and Rapid Prototyping. The volume contains reviewed papers presented at the 5th International Conference on Advanced Research in Virtual and Rapid Prototyping, hosted by the Centre for Rapid and Sustainable Product Development of the Polyt

Proceedings of the International Conference on Continuous Casting of Non-Ferrous Metals

Машиностроение

Their Physical and Mechanical Metallurgy

Proceedings of 5th Computational Methods in Systems and Software 2021, Vol. 1

Aluminium

Pocket Guide Foundry 2019

The investment casting process is an expendable mold process where wax patterns of the part and rigging are molded, assembled, shelled and melted to produce a ceramic mold matching the shape of the component to be cast. Investment casting is an important manufacturing method for critical parts because of the ability to maintain dimensional shape and tolerances. However, these tolerances can be easily exceeded if the molding components do not maintain their individual shapes well. In the investment casting process there are several opportunities for the final casting shape to not maintain the intended size and shape, such as shrinkage of the wax in the injection tool, the modification of the shape during shell heating, and with the thermal shrink and distortion in the casting process. Studies have been completed to look at the casting and shell distortions through the process in earlier phases of this project. Dr. Adrian Sabau at Oak Ridge National Labs performed characterizations and validations of 17-4 PH stainless steel in primarily fused silica shell systems with good agreement between analysis results and experimental data. Further tasks provided material property measurements of wax and methodology for employing a viscoelastic definition of wax materials into software. The final set of tasks involved the implementation of the findings into the commercial casting analysis software ProCAST, owned and maintained by ESI Group. This included: o the transfer of the wax material property data from its raw form into separate temperature-dependent thermophysical and mechanical property datasets o adding this wax material property data into an easily viewable and modifiable user interface within the pre-processing application of the

ProCAST suite, namely PreCAST o and validating the data and viscoelastic wax model with respect to experimental results.

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.

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

Special topic volume with invited peer-reviewed papers only

Proceedings from the Tenth International Conference on Modeling of Casting, Welding and Advanced Solidification Processes : Held in Destin, Florida on May 25-30, 2003

Continuous Casting

Fertigungsgerechte Bauteilgestaltung in der Topologieoptimierung auf Grundlage einer integrierten Gießsimulation

Handbook of Software Solutions for ICME

Modeling of Casting, Welding, and Advanced Solidification Processes-X

National Conference on Recent Advances in Engineering Technology and Science

In der Konzeptphase stellt die Topologieoptimierung ein verbreitetes, automatisiertes Entwicklungswerkzeug dar, um in wenigen Schritten aus den Bauteilanforderungen einen ersten Entwurf mit vielen geometrischen Freiheitsgraden zu generieren und Gewicht zu reduzieren. Insbesondere die Automobilindustrie unternimmt aufgrund gesetzlicher Vorgaben und Umweltzielen große Leichtbauanstrengungen. Neben automatisierten Entwicklungswerkzeugen ist ein weiteres Mittel die Verwendung von Leichtbauwerkstoffen wie Aluminium. Ziel dieser Arbeit ist die Entwicklung einer Topologieoptimierung mit integrierter Gießsimulation zur optimalen Auslegung von gegossenen Aluminiumkomponenten. Mit Hilfe der neu entwickelten Optimierungsmethodik ist die Einhaltung vieler relevanter Anforderungen an Gussbauteile bezüglich des mechanischen sowie des Herstellverhaltens möglich und Gewicht und Entwicklungszeit können eingespart werden. Durch die direkte Umsetzbarkeit der Optimierungsergebnisse wird ein durchgängiger Entwicklungsprozess möglich.

This fifth edition of the highly regarded family of titles that first published in 1965 is now a three-volume set and over 3,000 pages. All chapters have been revised and expanded, either by the fourth edition authors alone or jointly with new co-authors. Chapters have been added on the physical metallurgy of light alloys, the physical metallurgy of titanium alloys, atom probe field ion microscopy, computational metallurgy, and orientational imaging microscopy. The books incorporate the latest experimental research results and theoretical insights. Several thousand citations to the research and review literature are included. Exhaustively synthesizes the pertinent, contemporary developments within physical metallurgy so scientists have authoritative information at their fingertips Replaces existing articles and monographs with a single, complete solution Enables metallurgists to predict changes and create novel alloys and processes

Shape Casting of Metals, the proceedings from the symposium held to honor John Campbell for his contributions to the metal casting field, focuses on such topics as: Casting process design and characterization for improved structural quality and reliability, Process-structure-property-performance interrelationships in cast metals, Feeding and gating system design, Shape casting process modeling and improvement, and Molten metal quality and its effect on casting reliability. From the 2005 TMS Annual Meeting held in San Francisco, California, February 13 - 17, 2005.

International Conference on Mechanics and Materials Engineering (ICMME 2014)DEStech Publications, Inc

Bridging the Valley of Death for Materials and Processes in Defense Systems

Software Engineering Application in Informatics

Characterization of Minerals, Metals, and Materials 2021

Product Development for the Defense Industry

Fourth International Symposium 2011 (in honor of Prof. John T. Berry)

Computational Methods for Microstructure-Property Relationships

The conference aims to provide an excellent international academic forum for all the researchers, practitioner, students and teachers in related fields to share their knowledge and results in theory, methodology and application on mechanics and materials engineering. ICMME2014 features unique mixed topics of Mechanics, Materials Science and Materials Processing Technology, Emerging materials and other related ones. The ICMME2014 proceeding tends to collect the most up-to-date, comprehensive, and worldwide state-of-art knowledge on mechanics and materials engineering. All the accepted papers have been submitted to strict peer-review by 2–4

expert referees, and selected based on originality, significance and clarity for the purpose of the conference. The conference program is extremely rich, profound and featuring high-impact presentations of selected papers and additional late-breaking contributions. We sincerely hope that the conference would not only show the participants a broad overview of the latest research results on related fields, but also provide them a significant platform for academic connection and exchange.

The Sixth Edition of this influential best-selling book delivers the most up-to-date and comprehensive text and reference yet on the basis of the finite element method (FEM) for all engineers and mathematicians. Since the appearance of the first edition 38 years ago, The Finite Element Method provides arguably the most authoritative introductory text to the method, covering the latest developments and approaches in this dynamic subject, and is amply supplemented by exercises, worked solutions and computer algorithms. • The classic FEM text, written by the subject's leading authors • Enhancements include more worked examples and exercises • With a new chapter on automatic mesh generation and added materials on shape function development and the use of higher order elements in solving elasticity and field problems Active research has shaped The Finite Element Method into the pre-eminent tool for the modelling of physical systems. It maintains the comprehensive style of earlier editions, while presenting the systematic development for the solution of problems modelled by linear differential equations. Together with the second and third self-contained volumes (0750663219 and 0750663227), The Finite Element Method Set (0750664312) provides a formidable resource covering the theory and the application of FEM, including the basis of the method, its application to advanced solid and structural mechanics and to computational fluid dynamics. The classic introduction to the finite element method, by two of the subject's leading authors Any professional or student of engineering involved in understanding the computational modelling of physical systems will inevitably use the techniques in this key text

This book provides a comprehensive overview of essential topics related to conventional and advanced drying and energy technologies, especially motivated by increased industry and academic interest. The main topics discussed are: theory and applications of drying, emerging topics in drying technology, innovations and trends in drying, thermo-hydro-chemical-mechanical behaviors of porous materials in drying, and drying equipment and energy. Since the topics covered are inter-and multi-disciplinary, the book offers an excellent source of information for engineers, energy specialists, scientists, researchers, graduate students, and leaders of industrial companies. This book is divided into several chapters focusing on the engineering, science and technology applied in essential industrial processes used for raw materials and products.

Ongoing technical training, familiarisation with new developments and studying current research results are key components of everyday working practices. The Pocket Guide Foundry is intended to provide appropriate information and offer inspiration in addition to supporting the development of technical contacts. It is not merely a helpful complement to vocational training, studies or continuing education, but also serves as a straightforward reference for practitioners and suppliers in the foundry industry, for design engineers, production engineers and readers with technical interests.

Applications in Control, Electrical Engineering, IT and Robotics

Die Casting Engineer

Physical Metallurgy

Shape Casting of Metals

Energy and Resource Efficiency in Aluminium Die Casting

Fundamentals of Modeling for Metals Processing

Theoretical and practical interests in additive manufacturing (3D printing) are growing rapidly. Engineers and engineering companies now use 3D printing to make prototypes of products before going for full production. In an educational setting faculty, researchers, and students leverage 3D printing to enhance project-related products. Additive Manufacturing Handbook focuses on product design for the defense industry, which affects virtually every other industry. Thus, the handbook provides a wide range of benefits to all segments of business, industry, and government. Manufacturing has undergone a major advancement and technology shift in recent years.

The Continuous Casting 2000 symposium maintains the tradition established in 1976 of holding regular events. This millennium event, however, is the first international meeting of the series. The aim is to highlight the importance of continuous casting - of aluminum, copper and magnesium - to the international fabricating industry, focusing on technological advances in all the sectors that are important for the manufacture of high quality continuous cast products.

The sixth editions of these seminal books deliver the most up to date and comprehensive reference yet on the finite element method for all engineers and mathematicians. Renowned for their scope, range and authority, the new editions have been significantly developed in terms of both contents and scope. Each book is now complete in its own right and provides self-contained reference; used together they provide a formidable resource covering the theory and the application of the universally used FEM. Written by the leading professors in their fields, the three books cover the basis of the method, its application to solid mechanics and to fluid dynamics. * This is THE classic finite element method set, by two the subject's leading authors * FEM is a constantly developing subject, and any professional or student of engineering involved in understanding the computational modelling of physical systems will inevitably use the techniques in these books * Fully up-to-date; ideal for teaching and reference

In a career spanning almost six decades, Prof. John T. Berry has made significant contributions towards building our

understanding of solidification and process-structure-property relationships in shaped castings. Celebrating his contributions, the Fourth International Shape Casting Symposium, which takes place at the 2011 TMS Annual Meeting & Exhibition, has been organized in his honor. Shape Casting 2011 contains the proceedings of the symposium in which scientists and engineers from around the world presented their own research findings, discussed challenges in the field, and projected future directions. Papers explore such topics as liquid metal quality; filling and feeding systems; process modeling for shaped castings; structure-property relationships; performance of shaped castings; and machinability of castings.

CADmaster №2, 2013

Handbook of Induction Heating

Achievements of PLGrid Plus Domain-Specific Services and Tools

The John Campbell Symposium

Predicting Pattern Tooling and Casting Dimension for Investment Casting

Energy Saving Melting AndRevert Reduction Technology (E0SMARRT)

The latest in a series of proceedings from conferences sponsored by Engineering Conferences International (formerly the Engineering Foundation), this volume captures the current state of the art in the field of mathematical modeling of casting and welding processes. This edition deals with such traditional issues as microstructure formation, mushy zone rheology, segregation, microporosity, and thermo-mechanical simulation, as well as new themes reflecting industrial needs, including simulation of melting and solid separation in the melt (inclusion removal) and simulation of aggregate and porous materials (mold and core simulation). This book contains 90 papers as well as abstracts of invited talks. The proceedings focus primarily on the continuous development of tools for simulation of microstructure evolution, database and critical experiments, and shaped-casting simulation.

The second edition of the Handbook of Induction Heating reflects the number of substantial advances that have taken place over the last decade in theory, computer modeling, semi-conductor power supplies, and process technology of induction heating and induction heat treating. This edition continues to be a synthesis of information, discoveries, and technical insights that have been accumulated at Inductoheat Inc. With an emphasis on design and implementation, the newest edition of this seminal guide provides numerous case studies, ready-to-use tables, diagrams, rules-of-thumb, simplified formulas, and graphs for working professionals and students.

The collection focuses on the advancements of characterization of minerals, metals, and materials and the applications of characterization results on the processing of these materials. Advanced characterization methods, techniques, and new instruments are emphasized. Areas of interest include, but are not limited to: · Novel methods and techniques for characterizing materials across a spectrum of systems and processes. · Characterization of mechanical, thermal, electrical, optical, dielectric, magnetic, physical, and other properties of materials. · Characterization of structural, morphological, and topographical natures of materials at micro- and nano- scales. · Characterization of extraction and processing including process development and analysis. · Advances in instrument developments for microstructure analysis and performance evaluation of materials, such as computer tomography (CT), X-ray and neutron diffraction, electron microscopy (SEM, FIB, TEM), and spectroscopy (EDS, WDS, EBSD) techniques. · 2D and 3D modelling for materials characterization. The book explores scientific processes to characterize materials using modern technologies, and focuses on the interrelationships and interdependence among processing, structure, properties, and performance of materials.

Casting Aluminum Alloys, Second Edition, the follow up to the fall 2007 work on the structure, properties, thermal resistance, corrosion and fatigue of aluminum alloys in industrial manufacturing, discusses findings from the past decade, including sections on new casting alloys, novel casting technologies, and new methods of alloys design. The book also includes other hot topics, such as the implementation of computational technologies for the calculation of phase equilibria and thermodynamic properties of alloys, the development of software for calculation of diffusion processes in aluminum alloys, computational modeling of solidification microstructure and texture evolution of multi-component aluminum materials. In addition to changes in computational predictive abilities, there is a review of novel casting aluminum alloy compositions and properties, as well as descriptions of new casting technologies and updates to coverage on the mechanical properties of aluminum casting alloys. Presents a discussion of thermodynamic calculations used for assessing non-equilibrium solidifications of casting aluminum alloys Expands coverage of mathematical models for alloy mechanical properties, helping facilitate the selection of the best prospective candidate for new alloy development Contains a new section that describes the self-consistent evaluation of phase equilibria and thermodynamic properties of aluminum alloys

The Finite Element Method Set

Innovative Developments in Virtual and Physical Prototyping

MATLAB for Engineers

Proceedings of International Conference on Intelligent Manufacturing and Automation

Contribution of Metallography to Production Problem Solutions

Integrated Computational Materials Engineering

These volumes cover the properties, processing, and applications of metals and

nonmetallic engineering materials. They are designed to provide the authoritative information and data necessary for the appropriate selection of materials to meet critical design and performance criteria.

Accelerating the transition of new technologies into systems and products will be crucial to the Department of Defenses development of a lighter, more flexible fighting force. Current long transition times-ten years or more is now typical-are attributed to the complexity of the process. To help meet these challenges, the Department of Defense asked the National Research Council to examine lessons learned from rapid technology applications by integrated design and manufacturing groups. This report presents the results of that study, which was based on a workshop held to explore these successful cases. Three key areas emerged: creating a culture for innovation and rapid technology transition; methodologies and approaches; and enabling tools and databases.

The book presents several approaches in the key areas of practice for which the MATLAB software package was used. Topics covered include applications for: -Motors -Power systems -Robots -Vehicles The rapid development of technology impacts all areas. Authors of the book chapters, who are experts in their field, present interesting solutions of their work. The book will familiarize the readers with the solutions and enable the readers to enlarge them by their own research. It will be of great interest to control and electrical engineers and students in the fields of research the book covers.

Integrated computational materials engineering (ICME) is an emerging discipline that can accelerate materials development and unify design and manufacturing. Developing ICME is a grand challenge that could provide significant economic benefit. To help develop a strategy for development of this new technology area, DOE and DoD asked the NRC to explore its benefits and promises, including the benefits of a comprehensive ICME capability; to establish a strategy for development and maintenance of an ICME infrastructure, and to make recommendations about how best to meet these opportunities. This book provides a vision for ICME, a review of case studies and lessons learned, an analysis of technological barriers, and an evaluation of ways to overcome cultural and organizational challenges to develop the discipline.

Intermetallics 2016

Shape Casting

Malta, 17th-20th May 2005 : Summary of Project Findings

Structural and Functional Materials

Superalloys 2012

ASM Handbook

To help researchers from different areas of science understand and unlock the potential of the Polish Grid Infrastructure and to define their requirements and expectations, the following 13 pilot communities have been organized and involved in the PLGrid Plus project: Acoustics, AstroGrid-PL, Bioinformatics, Ecology, Energy Sector, Health Sciences, HEPGrid, Life Science, Materials, Metallurgy, Nanotechnologies, Quantum Chemistry and Molecular Physics, and SynchroGrid. The book describes the experience and scientific results achieved by the project partners. Chapters 1 to 8 provide a general overview of research and development activities in the framework of the project with emphasis on services for different scientific areas and an update on the status of the PL-Grid infrastructure, describing new developments in security and middleware. Chapters 9 to 13 discuss new environments and services which may be applied by all scientific communities. Chapters 14 to 36 present how the PLGrid Plus environments, tools and services are used in advanced domain specific computer simulations; these chapters present computational models, new algorithms, and ways in which they are implemented. The book also provides a glossary of terms and concepts. This book may serve as a resource for researchers, developers and system administrators working on efficient exploitation of available e-infrastructures, promoting collaboration and exchange of ideas in the process of constructing a common European e-infrastructure.

This book gathers selected papers presented at the Second International Conference on Intelligent Manufacturing and Automation (ICIMA 2020), which was jointly organized by the Departments of Mechanical Engineering and Production Engineering at Dwarkadas J. Sanghvi College of Engineering (DJSCE), Mumbai, and by the Indian Society of Manufacturing Engineers (ISME). Covering a range of topics in intelligent manufacturing, automation, advanced materials and design, it focuses on the latest advances in e.g. CAD/CAM/CAE/CIM/FMS in manufacturing, artificial intelligence in manufacturing, IoT in manufacturing, product design & development, DFM/DFA/FMEA, MEMS & nanotechnology, rapid prototyping, computational techniques, nano- & micro-machining, sustainable manufacturing, industrial engineering, manufacturing process management, modelling & optimization techniques, CRM, MRP & ERP, green, lean & agile manufacturing, logistics & supply chain management, quality assurance & environmental protection, advanced material processing & characterization of composite & smart materials. The book is intended as a reference guide for future researchers, and as a valuable resource for students in graduate and doctoral programmes.

A superalloy, or high-performance alloy, is an alloy that exhibits excellent mechanical strength at high

temperatures. Superalloy development has been driven primarily by the aerospace and power industries. This compilation of papers from the Twelfth International Symposium on Superalloys, held from September 9-13, 2012, offers the most recent technical information on this class of materials.
ICIMA 2020
International Conference on Mechanics and Materials Engineering (ICMME 2014)
Drying and Energy Technologies
Proceedings of the 5th International Conference on Advanced Research in Virtual and Rapid Prototyping, Leiria, Portugal, 28 September - 1 October, 2011
FENet Meeting Proceedings
Casting Aluminum Alloys