Optimization Of Continuous Casting Process In Steel

This book constitutes the refereed proceedings of the Third International Conference on Swarm, Evolutionary, and Memetic Computing, SEMCCO 2012, held in Bhubaneswar, India, in December 2012. The 96 revised full papers presented were carefully reviewed and selected from 310 initial submissions. The papers cover a wide range of topics in swarm, evolutionary, memetic and other intelligent computing algorithms and their real world applications in problems selected from diverse domains of science and engineering.

The MIT mission - "to bring together Industry and Academia and to nurture the next generation in computational mechanics is of great importance to reach the new level of mathematical modeling and numerical solution and to provide an exciting research environment for the next generation in computational mechanics." Mathematical modeling and numerical solution is today firmly established in science and engineering. Research conducted in almost all branches of scientific investigations and the design of systems in practically all disciplines of engineering can not be pursued effectively without, frequently, intensive analysis based on numerical computations. The world we live in has been classified by the human mind, for descriptive and analysis purposes, to consist of fluids and solids, continua and molecules; and the analyses of fluids and solids at the continuum and molecular scales have traditionally been pursued separately. Fundamentally, however, there are only molecules and particles for any material that interact on the microscopic and macroscopic scales. Therefore, to unify the analysis of physical systems and to reach a deeper understanding of the behavior of nature in scientific investigations, and of the behavior of designs in engineering endeavors, a new level of analysis is necessary. This new level of mathematical modeling and numerical solution does not merely involve the analysis of a single medium but must encompass the solution of multi-physics problems involving fluids, solids, and their interactions, involving multi-scale phenomena from the molecular to the macroscopic scales, and must include uncertainties in the given data and the solution results. Nature does not distinguish between fluids and solids and does not ever repeat itself exactly. This new level of analysis must also include, in engineering, the effective optimization of systems, and the modeling and analysis of complete life spans of engineering products, from design to fabrication, to possibly multiple repairs, to end of service.

In the world of modern engineering, rigorous and definite design methodologies are needed. However, many parts of engineering design are performed in either an ad-hoc manner or based on the intuition of the engineer. This is the first book to look at both stages of the design process – conceptual design and detailed design – and detail design methodologies for every step of the design process. Case studies show how practical design problems can be solved with analytic design methods. This book is an excellent introduction to the subject. The book's practical focus will make the book useful to practicing engineers as a practical handbook of design.

The use of parallel programming and architectures is essential for simulating and solving problems in modern computational practice. There has been rapid progress in microprocessor architecture, interconnection technology and software devel- ment, which are in?uencing directly the rapid growth of parallel and distributed computing. However, in order to make these bene?ts usable in

practice, this dev- opment must be accompanied by progress in the design, analysis and application aspects of parallel algorithms. In particular, new approaches from parallel num- ics are important for solving complex computational problems on parallel and/or distributed systems. The contributions to this book are focused on topics most concerned in the trends of today's parallel computing. These range from parallel algorithmics, progr- ming, tools, network computing to future parallel computing. Particular attention is paid to parallel numerics: linear algebra, differential equations, numerical integ- tion, number theory and their applications in computer simulations, which together form the kernel of the monograph. We expect that the book will be of interest to scientists working on parallel computing, doctoral students, teachers, engineers and mathematicians dealing with numerical applications and computer simulations of natural phenomena.

Advances in Computer Science, Intelligent Systems and Environment

TMS 2017 146th Annual Meeting & Exhibition Supplemental Proceedings

Catalytic Reactors

Multi-objective Optimization

Optimization of Secondary Cooling Water Filtration in a Continuous Stainless Steel Casting Process

This volume is a collection of papers presented at the International Symposium held in Montreal August 1988 as part of the 27th Annual Conference of Metallurgists, co-sponsored by the Canadian Steel Industry Research Association, the Canadian Continuous Steel Casting Research Group and the Canadian Institute of Mining and Metallurgy. Four topic areas are covered in the presentations: (1) casting practice and billet quality for direct rolling and hot charging; (2) temperature equalization methods and equipment; (3) surface quality and sensors and (4) mechanical handling of billets for direct rolling and charging.

The evolution of soft computing applications has offered a multitude of methodologies and techniques that are useful in facilitating new ways to address practical and real scenarios in a variety of fields. In particular, these concepts have created significant developments in the engineering field. Soft Computing Techniques and Applications in Mechanical Engineering is a pivotal reference source for the latest research findings on a comprehensive range of soft computing techniques applied in various fields of mechanical engineering. Featuring extensive coverage on relevant areas such as thermodynamics, fuzzy computing, and computational intelligence, this publication is an ideal resource for students, engineers, research scientists, and academicians involved in soft computing techniques and applications in mechanical engineering areas.

Advances in Metaheuristics: Applications in Engineering Systems provides details on current approaches utilized in engineering optimization. It gives a comprehensive background on metaheuristic applications, focusing on main engineering sectors such as energy, process, and materials. It discusses topics such as algorithmic enhancements and performance measurement approaches, and provides insights into the implementation of metaheuristic strategies to multi-objective optimization problems. With this book, readers can learn to solve real-world engineering optimization problems effectively using the appropriate techniques from emerging fields including evolutionary and swarm intelligence, mathematical programming, and multi-objective optimization. The ten chapters of this book are divided into three parts.

The first part discusses three industrial applications in the energy sector. The second focusses on process optimization and considers three engineering applications: optimization of a three-phase separator, process plant, and a pre-treatment process. The third and final part of this book covers industrial applications in material engineering, with a particular focus on sand mould-systems. It also includes discussions on the potential improvement of algorithmic characteristics via strategic algorithmic enhancements. This book helps fill the existing gap in literature on the implementation of metaheuristics in engineering applications and real-world engineering systems. It will be an important resource for engineers and decision-makers selecting and implementing metaheuristics to solve specific engineering problems.

This collection features papers presented at the 146th Annual Meeting & Exhibition of The Minerals, Metals & Materials Society.

Applications of Metaheuristics in Process Engineering

Science and Technology of Casting Processes

International Conference on Advances in the Theory of Ironmaking and Steelmaking (ATIS 2009), December 09-11,2009

Parallel Computing

And Its Engineering Applications

Computer-aided process engineering (CAPE) plays a key design and operations role in the process industries, from the molecular scale through managing complex manufacturing sites. The research interests cover a wide range of interdisciplinary problems related to the current needs of society and industry. ESCAPE 23 brings together researchers and practitioners of computer-aided process engineering interested in modeling, simulation and optimization, synthesis and design, automation and control, and education. The proceedings present and evaluate emerging as well as established research methods and concepts, as well as industrial case studies. Contributions from the international community using computer-based methods in process engineering Reviews the latest developments in process systems engineering Emphasis on industrial and societal challenges

Metaheuristics exhibit desirable properties like simplicity, easy parallelizability and ready applicability to different types of optimization problems such as real parameter optimization, combinatorial optimization and mixed integer optimization. They are thus beginning to play a key role in different industrially important process engineering applications, among them the synthesis of heat and mass exchange equipment, synthesis of distillation columns and static and dynamic optimization of chemical and bioreactors. This book explains cutting-edge research techniques in related computational intelligence domains and their applications in real-world process engineering. It will be of interest to industrial practitioners and research academics.

The series of Online World Conferences on Soft Computing (WSC) is organized by the World Federation of Soft Computing (WFSC) and has become an established annual event in the academic calendar and was already held for the 8th time in 2003. Starting as a small workshop

held at Nagoya University, Japan in 1994 it has - tured to the premier online event on soft computing in industrial applications. It has been hosted by the universities of Granada, Spain, Fraunhofer Gesellschaft, Berlin, Cran?eld University, Helsinki University of Technology and Nagoya University. The goal of WFSC is to promote soft computing across the world, by using the internet as a forum for virtual technical discussion and publishing at no cost to authors and participants. The of?cial journal of the World Federation on Soft Computing is the journal Applied Soft Computing. The 8th WSC Conference (WSC8) took place from September 29th to October 10th, 2003. Registered participants had the opportunity to follow and discuss the online presentations of authors from all over the world. Out of more than 60 subm- sions the program committee had accepted 27 papers for ?nal presentation at WSC8.

World Scientific Series in Applicable Analysis (WSSIAA) aims at reporting new developments of high mathematical standard and current interest. Each volume in the series shall be devoted to the mathematical analysis that has been applied or potentially applicable to the solutions of scientific, engineering, and social problems. This volume contains 30 research articles on the theory of optimization and its applications by the leading scientists in the field. It is hoped that the material in the present volume will open new vistas in research.Contributors: B D O Anderson, M Bertaja, O J Boxma, O Burdakov, A Cantoni, D J Clements, B D Craven, J B Cruz, Jr., P Diamond, S V Drakunov, Y G Evtushenko, N M Filatov, I Galligani, J C Geromel, F Giannessi, M J Grimble, G O Guardabassi, D-W Gu, C H Houpis, D G Hull, C Itiki, X Jian, M A Johnson, R E Kalaba, J C Kalkkuhl, M R Katebi, T J Kim, P Kloeden, T Kobylarz, A J Laub, C S Lee, G Leitmann, B-G Liu, J Liu, Z-Q Luo, K A Lurie, P Maponi, J B Matson, A Mess, G Pacelli, M Pachter, I Postlethwaite, T Rapcsak, M C Recchioni, Y Sakawa, S V Savastyuk, K Schittkowski, Y Shi, M A Sikora, D D Siljak, K L Teo, C Tovey, P Tseng, F E Udwadia, H Unbehauen, A Vladimirov, B Vo, J F Whidborne, R Xu, P L Yu, V G Zhadan, F Zirilli.

Information Engineering for Mechanics and Materials
Soft Computing Techniques and Applications in Mechanical Engineering
23rd European Symposium on Computer Aided Process Engineering
Recent Trends in Optimization Theory and Applications
28TH EUROPEAN SYMPOSIUM ON COMPUTER AIDED PROCESS ENGINEERING
Volume is indexed by Thomson Reuters CPCI-S (WoS). This work, with its 265 peer-reviewed papers, aims to address the hottest issues in materials and mechanics. It covers a wide range of topics in those areas; including materials science, mechanical engineering and materials, industrial applications of materials and mechanics, etc.: a useful and timely guide to the subject matter.
Contributed articles presented in the International Conference on Advances in the Theory of Ironmaking and Steelmaking; organized by the Dept. of Material Engineering, IISc., Bangalore.
This book introduces readers to the "Jaya" algorithm, an advanced

optimization technique that can be applied to many physical and engineering systems. It describes the algorithm, discusses its differences with other advanced optimization techniques, and examines the applications of versions of the algorithm in mechanical, thermal, manufacturing, electrical, computer, civil and structural engineering. In real complex optimization problems, the number of parameters to be optimized can be very large and their influence on the goal function can be very complicated and nonlinear in character. Such problems cannot be solved using classical methods and advanced optimization methods need to be applied. The Jaya algorithm is an algorithm-specific parameter-less algorithm that builds on other advanced optimization techniques. The application of Jaya in several engineering disciplines is critically assessed and its success compared with other complex optimization techniques such as Genetic Algorithms (GA), Particle Swarm Optimization (PSO), Differential Evolution (DE), Artificial Bee Colony (ABC), and other recently developed algorithms.
Describing a new optimization algorithm, the "Teaching-Learning-Based Optimization (TLBO)," in a clear and lucid style, this book maximizes reader insights into how the TLBO algorithm can be used to solve continuous and discrete optimization problems involving single or multiple objectives. As the algorithm operates on the principle of teaching and learning, where teachers influence the quality of learners' results, the elitist version of TLBO algorithm (ETLBO) is described along with applications of the TLBO algorithm in the fields of electrical engineering, mechanical design, thermal engineering, manufacturing engineering, civil engineering, structural engineering, computer engineering, electronics engineering, physics and biotechnology. The book offers a valuable resource for scientists, engineers and practitioners involved in the development and usage of advanced optimization algorithms.
Advances in Metaheuristics
Optimization of Manufacturing Processes
Evolutionary Computation
Ethics and Sustainability in Global Supply Chain Management
Swarm, Evolutionary, and Memetic Computing
This book deals with casting powders and explains how they work and how they are best used to minimise defects in the ninety per cent of world steel production that is continuously cast. It also includes a chapter on mould powders for ingot-casting. The factors affecting various aspects of powder performance are described and different defects, their causes, and means of avoiding them are considered. Providing the first comprehensive coverage of mould powder properties and uses, the text treats theoretical and practical matters and gives direct advice on problem-solving. Drawing on a wealth of scientific and technological research, represented by its extensive

references, The Casting Powders Book shows readers how they can design and create mould powders optimised to fulfil the necessary functions of: lubrication of steel shells and reduction of shell–mould friction; absorption of inclusions floating up from the steel; chemical insulation of steel from carbon-rich mould powder; and protection of the steel meniscus from oxidation and thermal insulation to prevent surface-freezing. Thermophysical properties and heat-transfer processes are also given detailed attention and case studies illustrate the methods and materials described. The Casting Powders Book is designed to be a periodic reference that can be dipped into as the need arises. Readers from different backgrounds are well-served by the depth and variety of content: engineers trouble-shooting a continuous-casting process interested in how mould fluxes can minimise defects and process problems and how their performance is in turn affected by casting parameters; academic scientists interested in the theoretical aspects and properties of mould fluxes and slag films; engineers working with ingot-casting processes; and many others will find this book an invaluable resource. Continuous casting is an industrial process whereby molten metal is solidified into a semi-finished billet, bloom, or slab for subsequent rolling in finishing mills; it is the most frequently used process to cast not only steel, but also aluminium and copper alloys. Since its widespread introduction for steel in the 1950s, it has evolved to achieve improved yield, quality, productivity and cost efficiency. It allows lower-cost production of metal sections with better quality, due to the inherently lower costs of continuous, standardized production of a product, as well as providing increased control over the process through automation. Nevertheless, challenges remain and new ones appear, as ways are sought to minimize casting defects and to cast alloys that could originally only be cast via other means. This Special Issue of the journal "Metals" consists of 14 research articles that cover many aspects of experimental work and theoretical modelling related to the ongoing development of continuous casting processes. 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.

All machining process are dependent on a number of inherent process parameters. It is of the utmost importance to find suitable combinations to all the process parameters so that the desired output response is optimized. While doing so may be nearly impossible or too expensive by carrying out experiments at all possible combinations, it may be done quickly and efficiently by using computational intelligence techniques. Due to the versatile nature of computational intelligence techniques, they can be used at different phases of the machining process design and optimization process. While powerful machine-learning methods like gene expression programming (GEP), artificial neural network (ANN), support vector regression (SVM), and more can be used at an early phase of the design and optimization process to act as predictive models for the actual experiments, other metaheuristics-based methods like cuckoo search, ant colony optimization, particle swarm optimization, and others can be used to optimize these predictive models to find the optimal process parameter combination. These machining and optimization processes are the future of manufacturing. Data-Driven Optimization of Manufacturing Processes contains the latest research on the application of state-of-the-art computational intelligence techniques from both predictive modeling and optimization viewpoint in both soft computing approaches and machining processes. The chapters provide solutions applicable to machining or manufacturing process problems and for optimizing the problems involved in other areas of mechanical, civil, and electrical engineering, making it a valuable reference tool. This book is addressed to engineers, scientists, practitioners, stakeholders, researchers, academicians, and students interested in the potential of recently developed powerful computational intelligence techniques towards improving the performance of machining processes.

Analytic Methods for Design Practice
The Casting Powders Book
Jaya: An Advanced Optimization Algorithm and its Engineering Applications

Teaching Learning Based Optimization Algorithm

Computational Fluid and Solid Mechanics

In this paper, we introduce robust optimization and stochastic programming strategies for addressing demand uncertainty in steelmaking continuous casting operations. Robust optimization framework was first employed to develop a deterministic robust counterpart optimization model and to guarantee that the production schedule be feasible for the varying demands. Then, a two-stage scenario based stochastic programming framework was studied for the scheduling of steelmaking and continuous operations under demand uncertainty. To make the resulting stochastic programming problem computationally tractable, a scenario reduction method has been applied to reduce the number of scenarios to a small set of representative realizations. Results from both the robust optimization and stochastic programming methods demonstrate robustness under demand uncertainty and the robust solution is slightly better than the stochastic solution.

This book deals with various science and technology factors that need careful consideration in producing a casting. It consists of 11 chapters contributed by experts in their respective fields. The topics include simulation of continuous casting process, control of solidification of continuous castings, influence of mold flux in continuous casting, segregation in strip casting of steel, developments in shell and solid investment mold processes, innovative pressure control during filling of sand molds, fracture toughness specifically of castings, permanent molding of cast iron, wear resistant castings and improvement of accuracy in estimating graphite nodularity in ductile iron castings.

Various industries in modern society can contribute to many different sustainable development initiatives. By implementing better processes for resource usage and its impacts, businesses can play a vital role in creating a cleaner environment. Ethics and Sustainability in Global Supply Chain Management is a comprehensive reference source for the latest scholarly material on organizational procedures and methods that ensure environmental sustainability, while maintaining effective production processes. Highlighting the most innovative topics and perspectives, such as life cycle costing, waste management, and business leadership, this book is ideally designed for professionals, academics, practitioners, graduate students, and researchers interested in developing green supply chain processes.

Sustainable Manufacturing examines the overall sustainability of a wide range of manufacturing processes and industrial systems. With chapters addressing machining, casting, additive and gear manufacturing processes; and hot topics such as remanufacturing, life cycle engineering, and recycling, this book is the most complete guide to this topic available. Drawing on experts in both academia and industry, coverage addresses theoretical developments and practical improvements from research and innovations. This unique book will advise readers on how to achieve sustainable manufacturing processes and systems, and further the clean and safe environment. This handbook is a part of the four volume set entitled Handbooks in Advanced Manufacturing. The other three address Advanced Machining and Finishing, Advanced Welding and Deforming, and Additive Manufacturing. Provides basic to advanced level information on various aspects of sustainable manufacturing Presents the strategies and techniques to achieve sustainability in numerous areas of

manufacturing and industrial engineering such as environmentally benign machining, sustainable additive manufacturing, remanufacturing and recycling, sustainable supply chain, and life cycle engineering Combines contributions from experts in academia and industry with the latest research and case studies Explains how to attain a clean, green, and safe environment via sustainable manufacturing Presents recent developments and suggests future research directions

Process metallurgy. B

Continuous Casting

Third International Conference, SEMCCO 2012, Bhubaneswar, India, December 20-22, 2012, Proceedings

Refining and Casting of Steel

11th International Symposium on High-Temperature Metallurgical Processing

This book presents several recent advances on Evolutionary Computation, specially evolution-based optimization methods and hybrid algorithms for several applications, from optimization and learning to pattern recognition and bioinformatics. This book also presents new algorithms based on several analogies and metafores, where one of them is based on philosophy, specifically on the philosophy of praxis and dialectics. In this book it is also presented interesting applications on bioinformatics, specially the use of particle swarms to discover gene expression patterns in DNA microarrays. Therefore, this book features representative work on the field of evolutionary computation and applied sciences. The intended audience is graduate, undergraduate, researchers, and anyone who wishes to become familiar with the latest research work on this field.

June 12-14, 2017 Rome, Italy Key Topics : Materials Science and Engineering, Nanomaterials and Nanotechnology, Biomaterials and Medical Devices, Polymer Science and Technology, Electronic, Optical and Magnetic Materials, Emerging Smart Materials, Materials for Energy and Environmental Sustainability, Metals, Mettalurgy and Materials, Physics and Cemistry of Materials, Mechanics, Characterization Techniques and Equipments, Ceramics and Composite Materials, Entrepreneurs Investment Meet,

In recent years, global metallurgical industries have experienced fast and prosperous growth. High-temperature metallurgical technology is the backbone to support the technical, environmental, and economical needs for this growth. This collection features contributions covering the advancements and developments of new high-temperature metallurgical technologies and their applications to the areas of processing of minerals; extraction of metals; preparation of refractory and ceramic materials; sintering and synthesis of fine particles; treatment and recycling of slag and wastes; and saving of energy and protection of environment. The volume will have a broad impact on the academics and professionals serving the metallurgical industries around the world.

This proceedings volume contains a selection of papers presented at the symposium "International Conference on High Performance Scientific Computing" held at the Hanoi Institute of Mathematics of the Vietnam National Center for Natural Science and Technology (NCST), March 10-14, 2003. The conference has been organized by the Hanoi Institute of Mathematics, SFB 359 "Reactive Flows, Transport and Diffusion", Heidelberg, Ho Chi Minh City University of Technology and Interdisciplinary Center for Scientific Computing (IWR), Heidelberg. The contributions cover the broad interdisciplinary spectrum of scientific computing and present recent advances in theory, development of methods, and applications in practice. Subjects covered are mathematical modelling, numerical simulation, methods for optimization and optimal control, parallel computing, symbolic computing, software development, applications of scientific computing in physics, chemistry, biology and mechanics, environmental and hydrology problems, transport, logistics and site location, communication networks, production scheduling, industrial and commercial problems.
Proceedings of the International Conference on High Performance Scientific Computing, March 10-14, 2003, Hanoi, Vietnam
Sustainable Manufacturing
23 European Symposium on Computer Aided Process Engineering
Soft Computing: Methodologies and Applications
Journal of Material Sciences & Engineering : Volume 6
The use of artificial intelligence, especially in the field of optimization is increasing day by day. The purpose of this book is to explore the possibility of using different kinds of optimization algorithms to advance and enhance the tools used for computer and electrical engineering purposes.
This book provides a detailed understanding of optimization methods as they are implemented in a variety of manufacturing, fabrication and machining processes. It covers the implementation of statistical methods, multi-criteria decision making methods and evolutionary techniques for single and multi-objective optimization to improve quality, productivity, and sustainability in manufacturing. It reports on the theoretical aspects, special features, recent research and latest development in the field. Optimization of Manufacturing Processes is a valuable source of information for researchers and practitioners, as it fills the gap where no dedicated book is available on intelligent manufacturing/modeling and optimization in manufacturing. Readers will develop an understanding of the implementation of statistical and evolutionary techniques for modeling and optimization in manufacturing.
CSISE2011 is an integrated conference concentrating its focus upon Computer Science,Intelligent System and Environment. In the proceeding, you can learn much more knowledge about Computer Science, Intelligent System and Environment of researchers all around the world. The international conference will provide a forum for engineers, scientist,

teachers and all researchers to discuss their latest research achievements and their future research plan. The main role of the proceeding is to be used as an exchange pillar for researchers who are working in the mentioned field. In order to meet high standard of Springer´s Advances in Intelligent and Soft Computing ,the organization committee has made their efforts to do the following things. Firstly, poor quality paper has been refused after reviewing course by anonymous referee experts. Secondly, periodically review meetings have been held around the reviewers about five times for exchanging reviewing suggestions. Finally, the conference organization had several preliminary sessions before the conference. Through efforts of different people and departments, the conference will be successful and fruitful. We hope that you can get much more knowledges from our CSISE2011, and we also hope that you can give us good suggestions to improve our work in the future.

28th European Symposium on Computer Aided Process Engineering, Volume 43 contains the papers presented at the 28th European Society of Computer-Aided Process Engineering (ESCAPE) event held in Graz, Austria June 10-13 , 2018. It is a valuable resource for chemical engineers, chemical process engineers, researchers in industry and academia, students, and consultants for chemical industries. Presents findings and discussions from the 28th European Society of Computer-Aided Process Engineering (ESCAPE) event

Direct Rolling and Hot Charging of Strand Cast Billets

Proceedings of 9th World Congress on Materials Science and Engineering 2017

Applications in Engineering Systems

Vol.3

Metaheuristics and Optimization in Computer and Electrical Engineering

Following a brief introduction and general review on the development of multi-objective optimization applications in chemical engineering since 2000, the book gives a descripti of selected multi-objective techniques and then goes on to discuss chemical engineerin applications. These applications are from diverse areas within chemical engineering, and are presented in detail. Several exercises are included at the end of many chapters. Catalytic Reactors presents several key aspects of reactor design in Chemical and Proc Engineering. Starting with the fundamental science across a broad interdisciplinary fiel this graduate level textbook offers a concise overview on reactor and process design f students, scientists and practitioners new to the field. This book aims to collate into a comprehensive and well-informed work of leading researchers from north America, western Europe and south-east Asia. The editor and international experts discuss state the-art applications of multifunctional reactors, biocatalytic membrane reactors, micro-flow reactors, industrial catalytic reactors, micro trickle bed reactors and multiphase catalytic reactors. The use of catalytic reactor technology is essential for the economi viability of the chemical manufacturing industry. The importance of Chemical and Proce Engineering and efficient design of reactors are another focus of the book. Especially t combination of advantages from both catalysis and chemical reaction technology for optimization and intensification as essential factors in the future development of react and processes are discussed. Furthermore, options that can drastically influence reacti

processes, e.g. choice of catalysts, alternative reaction pathways, mass and heat trans effects, flow regimes and inherent design of catalytic reactors are reviewed in detail. Focuses on the state-of-the-art applications of catalytic reactors and optimization in t design and operation of industrial catalytic reactors Insights into transfer of knowledg from laboratory science to industry For students and researchers in Chemical and Mechanical Engineering, Chemistry, Industrial Catalysis and practising Engineers

Steel has become the most requested material all over the world during the rapid technological evolution of recent centuries. As our civilization grows and its technologi development becomes connected with more demanding processes, it is more and more challenging to fit the required physical and mechanical properties for steel in its huge portfolio of grades for each steel producer. It is necessary to improve the refining and casting processes continuously to meet customer requirements and to lower the prod costs to remain competitive. New challenges related to both the precise design of stee properties and reduction in production costs are combined with paying special attentio environmental protection. These contradictory demands are the theme of this book.

Proceedings of the Metallurgical Society of the Canadian Institute of Mining and Metallurgy

Numerics, Applications, and Trends

Knowledge-based Methodology for the Design and Optimization of a Continuous Castin Manufacturing Process

Data-Driven Optimization of Manufacturing Processes

Scheduling Continuous Casting of Aluminum Using a Multiple-objective Ant Colony Optimization Metaheuristic