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OPF5H8 - JUNE JAMIYA

This volume comprises the proceedings of the 42nd National and 5th International Conference on Fluid Mechanics and Fluid Power held at IIT Kanpur in December, 2014. The conference proceedings encapsulate the best deliberations held during the conference. The diversity of participation in the conference, from academia, industry and research laboratories reflects in the articles appearing in the volume. This contributed volume has articles from authors who have participated in the conference on thematic areas such as Fundamental Issues and Perspectives in Fluid Mechanics; Measurement Techniques and Instrumentation; Computational Fluid Dynamics; Instability, Transition and Turbulence; Turbomachinery; Multiphase Flows; Fluid-Structure Interaction and Flow-Induced Noise; Microfluidics; Bio-inspired Fluid Mechanics; Internal Combustion Engines and Gas Turbines; and Specialized Topics. The contents of this volume will prove useful to researchers from industry and academia alike.

"Present understanding of transition to turbulence has now been studied over one hundred and fifty years. The path the studies have taken posed it as a modal eigenvalue problem. Some researchers have suggested alternative models without being specific. First-principle based approach of receptivity is the route to build bridges among ideas for solving the Navier-Stokes equation for specific canonical problems. This book highlights the mathematical physics, scientific computing, and new ideas and theories for nonlinear analyses of fluid flows, for which vorticity dynamics remain central. This book is a blend of classic with distinctly new ideas, which establish different dynamics of flows, from genesis to evolution of disturbance fields with rigorously developed methods to tracing coherent structures amidst the seemingly random and chaotic fluid dynamics of transitional and turbulent flows"--

The Hydrocyclone reviews data on the theoretical, design, and performance aspects of the liquid cyclone, hydraulic cyclone, or hydrocyclone. The book aims to be a source of reference to those who are in industries employing the use and application of the hydrocyclone. The text covers the historical development of the cyclone; flow pattern and distribution of velocities within the cyclone body; operational characteristics and areas of application in different phase separations; and the operating and design variables affecting the performance of the hydrocyclone. Categories of cyclone; commercially available cyclone equipment; and the specific industrial applications of the hydrocyclone are also surveyed. The text will be of practical use to industrial engineers, mechanical engineers, plant operators, miners, and researchers.

Computational Fluid Dynamics enables engineers to model and predict fluid flow in powerful, visually impressive ways and is one of the core engineering design tools, essential to the study and future work of many engineers. This textbook is designed to explicitly meet the needs engineering students taking a first course in CFD or computer-aided engineering. Fully course matched, with the most extensive and rigorous pedagogy and features of any book in the field, it is certain to be a key text. The only course text available specifically designed to give an applications-lead, commercial software oriented approach to understanding and using Computational Fluid Dynamics (CFD). Meets the needs of all engineering disciplines that use CFD. The perfect CFD teaching resource: clear, straightforward text, step-by-step explanation of mathematical foundations, detailed worked examples, end-of-chapter knowledge check exercises, and homework assignment questions

The proliferation of technological capability, miniaturization, and demand for aerial intelligence is pushing unmanned aerial systems (UAS) into the realm of a multi-billion dollar industry. This book surveys the UAS landscape from history to future applications. It discusses commercial applications, integration into the national airspace system (NAS), System function, operational procedures, safety concerns, and a host of other relevant topics. The book is dynamic and well-illustrated with separate sections for terminology and web-based resources for further information.

PREFACE. THE Author of this very practical treatise on Scotch Loch - Fishing desires clearly that it may be of use to all who had it. He does not pretend to have written anything new, but to have attempted to put what he has to say in as readable a form as possible. Everything in the way of the history and habits of fish has been studiously avoided, and technicalities have been used as sparingly as possible. The writing of this book has afforded him pleasure in his leisure moments, and that pleasure would be much increased if he knew that the perusal of it would create any bond of sympathy between himself and the angling community in general. This section is interleaved with blank sheets for the readers notes. The Author need hardly say that any suggestions addressed to the case of the publishers, will meet with consideration in a future edition. We do not pretend to write or enlarge upon a new subject. Much has been said and written-and well said and written too on the art of fishing but loch-fishing has been rather looked upon as a second-rate performance, and to dispel this idea is one of the objects for which this present treatise has been written. Far be it from us to say anything against fishing, lawfully practised in any form but many pent up in our large towns will bear us out when we say that, on the whole, a days loch-fishing is the most convenient. One great matter is, that the loch-fisher is depend- ent on nothing but enough wind to curl the water, -and on a large loch it is very seldom that a dead calm prevails all day, -and can make his arrangements for a day, weeks beforehand whereas the stream- fisher is dependent for a good take on the state of the water and however pleasant and easy it may be for one living near the banks of a good trout stream or river, it is quite another matter to arrange for a days river-fishing, if one is looking forward to a holiday at a date some weeks ahead. Providence may favour the expectant angler with a good day, and the water in order but experience has taught most of us that the good days are in the minority, and that, as is the case with our rapid running streams, -such as many of our northern streams are, -the water is either too large or too small, unless, as previously remarked, you live near at hand, and can catch it at its best. A common belief in regard to loch-fishing is, that the tyro and the experienced angler have nearly the same chance in fishing, -the one from the stern and the other from the bow of the same boat. Of all the absurd beliefs as to loch-fishing, this is one of the most absurd. Try it. Give the tyro either end of the boat he likes give him a cast of ally flies he may fancy, or even a cast similar to those which a crack may be using and if he catches one for every three the other has, he may consider himself very lucky. Of course there are lochs where the fish are not abundant, and a beginner may come across as many as an older fisher but we speak of lochs where there are fish to be caught, and where each has a fair chance. Again, it is said that the boatman has as much to do with catching trout in a loch as the angler. Well, we dont deny that. In an untried loch it is necessary to have the guidance of a good boatman but the same argument holds good as to stream-fishing...

Over half of the products of the chemical and process industries are sold in a particulate form. The range of such products is vast: from agrochemicals to pigments, from detergents to foods, from plas-

tics to pharmaceuticals. However, surveys of the performance of processes designed to produce particulate products have consistently shown inadequate design and poor reliability. 'Particle technology' is a new subject facing new challenges. Chemical and process engineering is becoming less concerned with the design of plants to produce generic simple chemicals (which are often single phase fluids) and is now more concerned with speciality 'effect' chemicals which may often be in particulate form. Chemical and process engineers are also being recruited in increasing numbers into areas outside their traditional fields, such as the food industry, pharmaceuticals and the manufacture of a wide variety of consumer products. This book has been written to meet their needs. It provides comprehensive coverage of the technology of particulate solids, in a form which is both accessible and concise enough to be useful to engineering and science students in the final year of an undergraduate degree, and at Master's level. Although it was written with students of chemical engineering in mind, it will also be of use and interest to students of other disciplines. It comprises an account of the fundamentals of the subject, illustrated by worked examples, and followed by a wide range of selected applications.

Mineral Processing: Beneficiation Operations and Process Optimization through Modeling is written for both individuals working in industry as well as students. Processing techniques for the recovery or extraction of a particular mineral are largely dictated by the physical, chemical, and mineral characteristics of that particular mineral. The design of the process flow sheet and the configuration of the circuit can vary from situation to situation, as well, and this book guides readers in formulating those flow sheets for various minerals in order to assist in selecting the right equipment for the process. The book serves as a guide to mineral processing plant engineers for flow sheet development of various minerals, including coal and steel plant waste. It additionally includes alternative flow sheets and process routes for plant design. Outlines numerical modeling techniques employed for understanding processes Discusses optimization of processing techniques Covers various concepts and issues related to recovery or extraction of a particular mineral from its ore Provides guidance for greenfield projects with insight into choosing the correct circuit configuration for treating ores, given the grade and availability

This book gathers selected papers from the 8th International Field Exploration and Development Conference (IFEDC 2018) and addresses a broad range of topics, including: Reservoir Surveillance and Management, Reservoir Evaluation and Dynamic Description, Reservoir Production Stimulation and EOR, Ultra-Tight Reservoirs, Unconventional Oil and Gas Resources Technology, Oil and Gas Well Production Testing, and Geomechanics. In brief, the papers introduce readers to upstream technologies used in oil & gas development, the main principles of the process, and various related design technologies. The conference not only provided a platform to exchange experiences, but also promoted the advancement of scientific research in oil & gas exploration and production. The book is chiefly intended for industry experts, professors, researchers, senior engineers, and enterprise managers.

The Chemical Engineer's Practical Guide to Fluid Mechanics: Now Includes COMSOL Multiphysics 5 Since most chemical processing applications are conducted either partially or totally in the fluid phase, chemical engineers need mastery of fluid mechanics. Such knowledge is especially valuable in the biochemical, chemical, energy, fermentation, materials, mining, petroleum, pharmaceuticals, polymer, and waste-processing industries. Fluid Mechanics for Chemical Engineers: with Microfluidics, CFD, and COMSOL Multiphysics 5, Third Edition, systematically introduces fluid mechanics from the perspective of the chemical engineer who must understand actual physical behavior and solve real-world problems. Building on the book that earned Choice Magazine's Outstanding Academic Title award, this edition also gives a comprehensive introduction to the popular COMSOL Multiphysics 5 software. This third edition contains extensive coverage of both microfluidics and computational fluid dynamics, systematically demonstrating CFD through detailed examples using COMSOL Multiphysics 5 and ANSYS Fluent. The chapter on turbulence now presents valuable CFD techniques to investigate practical situations such as turbulent mixing and recirculating flows. Part I offers a clear, succinct, easy-to-follow introduction to macroscopic fluid mechanics, including physical properties; hydrostatics; basic rate laws; and fundamental principles of flow through equipment. Part II turns to microscopic fluid mechanics: Differential equations of fluid mechanics Viscous-flow problems, some including polymer processing Laplace's equation; irrotational and porous-media flows Nearly unidirectional flows, from boundary layers to lubrication, calendaring, and thin-film applications Turbulent flows, showing how the k-ε method extends conventional mixing-length theory Bubble motion, two-phase flow, and fluidization Non-Newtonian fluids, including inelastic and viscoelastic fluids Microfluidics and electrokinetic flow effects, including electroosmosis, electrophoresis, streaming potentials, and electroosmotic switching Computational fluid mechanics with ANSYS Fluent and COMSOL Multiphysics Nearly 100 completely worked practical examples include 12 new COMSOL 5 examples: boundary layer flow, non-Newtonian flow, jet flow, die flow, lubrication, momentum diffusion, turbulent flow, and others. More than 300 end-of-chapter problems of varying complexity are presented, including several from University of Cambridge exams. The author covers all material needed for the fluid mechanics portion of the professional engineer's exam. The author's website (fmche.engin.umich.edu) provides additional notes, problem-solving tips, and errata. Register your product at informit.com/register for convenient access to downloads, updates, and corrections as they become available.

Group method of data handling (GMDH) is a typical inductive modeling method built on the principles of self-organization. Since its introduction, inductive modelling has been developed to support complex systems in prediction, clusterization, system identification, as well as data mining and knowledge extraction technologies in social science, science, engineering, and medicine. This is the first book to explore GMDH using MATLAB (matrix laboratory) language. Readers will learn how to implement GMDH in MATLAB as a method of dealing with big data analytics. Error-free source codes in MATLAB have been included in supplementary material (accessible online) to assist users in their understanding in GMDH and to make it easy for users to further develop variations of GMDH algorithms. Contents:Basic/Standard GMDH:Introduction (Godfrey C Onwubolu)GMDH Multilayered Algorithm (Godfrey C Onwubolu)GMDH Multilayered Algorithm in MATLAB (Mohammed Abdalla Ayoub Mohammed)Hybrid GMDH System:GMDH-Based Polynomial Neural Network Algorithm in MATLAB (E-laine Inácio Bueno, Iraci Martinez Pereira and Antonio Teixeira e Silva)Designing GMDH Model Using Modified Levenberg Marquardt Technique in Matlab (Maryam Pournasir Roudbaneh)Group Method of Data Handling Using Discrete Differential Evolution in Matlab (Donald Davendra, Godfrey Onwubolu and Ivan Zelinka) Readership: Professionals and students interested in data mining and analytics.

The book provides highly specialized researchers and practitioners with a major contribution to

mathematical models' developments for energy systems. First, dynamic process simulation models based on mixture flow and two-fluid models are developed for combined-cycle power plants, pulverised coal-fired power plants, concentrated solar power plant and municipal waste incineration. Operation data, obtained from different power stations, are used to investigate the capability of dynamic models to predict the behaviour of real processes and to analyse the influence of modeling assumptions on simulation results. Then, a computational fluid dynamics (CFD) simulation programme, so-called DEMEST, is developed. Here, the fluid-solid, particle-particle and particle-wall interactions are modeled by tracking all individual particles. To this purpose, the deterministic Euler-Lagrange/Discrete Element Method (DEM) is applied and further improved. An emphasis is given to the determination of inter-phase values, such as volumetric void fraction, momentum and heat transfers, using a new procedure known as the offset-method and to the particle-grid method allowing the refinement of the grid resolution independently from particle size. Model validation is described in detail. Moreover, thermochemical reaction models for solid fuel combustion are developed based on quasi-single-phase, two-fluid and Euler-Lagrange/MP-PIC models. Measurements obtained from actual power plants are used for validation and comparison of the developed numerical models.

The field of Chemical Engineering and its link to computer science is in constant evolution and new engineers have a variety of tools at their disposal to tackle their everyday problems. Introduction to Software for Chemical Engineers, Second Edition provides a quick guide to the use of various computer packages for chemical engineering applications. It covers a range of software applications from Excel and general mathematical packages such as MATLAB and MathCAD to process simulators, CHEMCAD and ASPEN, equation-based modeling languages, gProms, optimization software such as GAMS and AIMS, and specialized software like CFD or DEM codes. The different packages are introduced and applied to solve typical problems in fluid mechanics, heat and mass transfer, mass and energy balances, unit operations, reactor engineering, process and equipment design and control. This new edition offers a wider view of packages including open source software such as R, Python and Julia. It also includes complete examples in ASPEN Plus, adds ANSYS Fluent to CFD codes, Lingo to the optimization packages, and discusses Engineering Equation Solver. It offers a global idea of the capabilities of the software used in the chemical engineering field and provides examples for solving real-world problems. Written by leading experts, this book is a must-have reference for chemical engineers looking to grow in their careers through the use of new and improving computer software. Its user-friendly approach to simulation and optimization as well as its example-based presentation of the software, makes it a perfect teaching tool for both undergraduate and master levels.

Master's Thesis from the year 2019 in the subject Physics - Applied physics, Imperial College London, language: English, abstract: As the need to transition towards renewable energies becomes increasingly evident and a growing number of regions are subject to more intense water stresses, various power-generation and electricity-production technologies are being developed. Among these, the Solar Cyclone Tower (SCT) appears to be a promising solution, for both electricity and water production, which is based on a renewable energy source: sunlight. In this thesis, the author explores the different features of the SCT technology, its operating concept and advantages. He also presents a physical model which has been built for pedagogical uses. He discusses how the SCT's water and electricity production can be enhanced. Potential facilities which the SCT could host are also considered and the solar tower's overall advantages listed. We explain how various physical phenomena make environmental variables difficult to predict and challenging to probe. However, it is necessary to acquire real-time data on environmental variables such as temperature, humidity, insolation and airflow for a number of different reasons which he will discuss. He has thus undertaken a study and review of different temperature, humidity, insolation and airflow sensing technologies which are suitable for use in the SCT. He later characterised a simple temperature and humidity sensing device and, finally, presented the outline of a sensor placement algorithm and a method to find the optimal number of sensors.

Volume is indexed by Thomson Reuters CPCI-S (WoS). The objective of this special collection is to provide a showcase for researchers, educators, engineers and government officials, involved in the general areas of Components, Packaging and Manufacturing Technology, by which to highlight the latest research results and to exchange views on the future direction of research in these fields. The topics covered include: Advanced Measurement, Test and Information Technology, Components, Packaging and Manufacturing Technology.

This book gathers the best articles presented by researchers and industrial experts at the International Conference on "Innovative Design and Development Practices in Aerospace and Automotive Engineering (I-DAD 2018)". The papers discuss new design concepts, analysis and manufacturing technologies, with an emphasis on achieving improved performance by downsizing; improving the weight-to-strength ratio, fuel efficiency, and operational capability at room and elevated temperatures; reducing wear and tear; and addressing NVH aspects, while balancing the challenges of Euro IV/Barat Stage IV emission norms and beyond, greenhouse effects, and recyclable materials. The innovative methods discussed here offer valuable reference material for educational and research organizations, as well as industry, encouraging them to pursue challenging projects of mutual interest.

The 31st European Symposium on Computer Aided Process Engineering: ESCAPE-31, Volume 50 contains the papers presented at the 31st European Symposium of Computer Aided Process Engineering (ESCAPE) event held in Istanbul, Turkey. It is a valuable resource for chemical engineers, chemical process engineers, researchers in industry and academia, students and consultants in the chemical industries. Presents findings and discussions from the 31st European Symposium of Computer Aided Process Engineering (ESCAPE) event

This study presents the basic models for discrete and continuous particle laden flow simulation. An overview of the two main approaches, the Lagrangian discrete particle model and the Eulerian granular phase model is given. Moreover these two approaches are combined to a hybrid model to use the benefits of the discrete and continuous description. This saves computational time and increase the efficiency of particle laden flow simulations. Furthermore the models are extended to poly-disperse particles including a simple agglomeration model based on a population balance equation. Finally the usability of the models is shown at a pneumatic particle transport system including particle strand building and the separation of particles using an industrial cyclone.

Since the publication of the first edition of Canada, and Australia have increased teach Handbook of Powder Science and Technology, ing, research, and training activities in areas the field of powder science and technology has related to particle science and technology. gained broader recognition and its various ar In addition, it is worth mentioning the many eas of interest have become more defined and books and monographs that have been pub focused. Research and application activities lished on specific areas of particle, powder, related to particle technology have increased and particle fluid by professional publishers, globally in academia, industry, and research technical societies and university presses. Also, institutions. During the last decade, many to date, there are many career development groups, with various scientific, technical, and courses given by specialists and universities on engineering backgrounds have been founded various facets of powder science and technol to study, apply, and promote interest in areas ogy.

International in coverage, the book offers industrial engineers a new and practical approach to solv-

ing problems in droplet separation. Without going into needless detail, it addresses such problems as the cost of droplet separation, the physical effects involved, separation efficiencies expected, and the lessons to be learned from industrial practice. Numerous diagrams, uncomplicated and reliable formulas, and lucid examples are presented to help design and calculate droplet separators. An exhaustive survey, based on twenty years of experience, the book is unparalleled in its field. Special feature: the introduction of a new dimensionless number.

This book offers several solutions or approaches in solving mass transfer problems for different practical chemical engineering applications: measurements of the diffusion coefficients, estimation of the mass transfer coefficients, mass transfer limitation in separation processes like drying, extractions, absorption, membrane processes, mass transfer in the microbial fuel cell design, and problems of the mass transfer coupled with the heterogeneous combustion. I believe this book can provide its readers with interesting ideas and inspirations or direct solutions of their particular problems.

The 2014 International Conference on Energy and Environment (ICEE 2014) was held June 26-27 in Beijing, China. The objective of ICEE 2014 was to provide a platform for researchers, engineers, academics as well as industry professionals from all over the world to present their research results and development activities in Energy and Environment res

Microplastic Pollutants introduces the reader to the growing problem of microplastic pollution in the aquatic environment and is the first ever book dedicated exclusively to the subject of microplastics. Importantly, this timely full-colour illustrated multidisciplinary book highlights the very recent realization that microplastics may transport toxic chemicals into food chains around the world. Microplastic pollutants is currently an important topic in both industry and academia, as well as among legislative bodies, and research in this area is gaining considerable attention from both the worldwide media and scientific community on a rapidly increasing scale. Ultimately, this book provides an excellent source of reference and information on microplastics for scientists, engineers, students, industry, policy makers and citizens alike.

This book presents the latest advances in flowsheet simulation of solids processes, focusing on the dynamic behaviour of systems with interconnected solids processing units, but also covering stationary simulation. The book includes the modelling of solids processing units, for example for comminution, sifting and particle formulation and also for reaction systems. Furthermore, it examines new approaches for the description of solids and their property distributions and for the mathematical treatment of flowsheets with multivariate population balances.

Slurry Flow: Principles and Practice describes the basic concepts and methods for understanding and designing slurry flow systems, in-plan installations, and long-distance transportation systems. The goal of this book is to enable the design or plant engineer to derive the maximum benefit from a limited amount of test data and to generalize operating experience to new situations. Design procedures are described in detail and are accompanied by illustrative examples needed by engineers with little or no previous experience in slurry transport. The technical literature in this field is extensive: this book facilitates its use by surveying current research results and providing explanations of mechanistic flow models. This discussion of background scientific principles helps the practitioner to better interpret test data, select pumps, specify materials of construction, and choose measuring devices for slurry transport systems. The extensive range of topics covered in Slurry Flow: Principles and practice includes slurry rheology, homogeneous and heterogeneous slurry flow principles, wear mechanisms, pumping equipment, instrumentation, and operating aspects.

Computational fluid dynamics (CFD), which uses numerical analysis to predict and model complex flow behaviors and transport processes, has become a mainstream tool in engineering process research and development. Complex chemical processes often involve coupling between dynamics at vastly different length and time scales, as well as coupling of different physical models. The multiscale and multiphysics nature of those problems calls for delicate modeling approaches. This book showcases recent contributions in this field, from the development of modeling methodology to its application in supporting the design, development, and optimization of engineering processes.

Since the publication of the first edition of Multiphase Flow with Droplets and Particles, there have been significant advances in science and engineering applications of multiphase fluid flow. Maintaining the pedagogical approach that made the first edition so popular, this second edition provides a background in this important area of fluid mecha

This book (Vol. II) presents select proceedings of the conference on "Advancement in Materials, Manufacturing, and Energy Engineering (ICAMME 2021)." It discusses the latest materials, manufacturing processes, evaluation of materials properties for the application in automotive, aerospace, marine, locomotive, and energy sectors. The topics covered include advanced metal forming, bending, welding and casting techniques, recycling and re-manufacturing of materials and components, materials processing, characterization and applications, materials, composites and polymer manufacturing, powder metallurgy and ceramic forming, numerical modeling and simulation, advanced machining processes, functionally graded materials, non-destructive examination, optimization techniques, engineering materials, heat treatment, material testing, MEMS integration, energy materials, bio-materials, metamaterials, metallography, nanomaterial, SMART materials, bioenergy, fuel cell, and superalloys. The book will be useful for students, researchers, and professionals interested in interdisciplinary topics in the areas of materials, manufacturing, and energy sectors.

This book presents selected peer reviewed papers from the International Conference on Advanced Production and Industrial Engineering (ICAPIE 2019). It covers a wide range of topics and latest research in mechanical systems engineering, materials engineering, micro-machining, renewable energy, industrial and production engineering, and additive manufacturing. Given the range of topics discussed, this book will be useful for students and researchers primarily working in mechanical and industrial engineering, and energy technologies.

This book has been conceived to provide guidance on the theory and design of cyclone systems. For those new to the topic, a cyclone is, in its most basic form, a stationary mechanical device that utilizes centrifugal force to separate solid or liquid particles from a carrier gas. Gas enters near the top via a tangential or vaned inlet, which gives rise to an axially descending spiral of gas and a centrifugal force field that causes the incoming particles to concentrate along, and spiral down, the inner walls of the separator. The thus-segregated particulate phase is allowed to exit out an underflow pipe while the gas phase constricts, and - in most separators - reverses its axial direction of flow and exits out a separate overflow pipe. Cyclones are applied in both heavy and light industrial applications and may be designed as either classifiers or separators. Their applications are as plentiful as they are varied. Examples include their use in the separation or classification of powder coatings, plastic fines, sawdust, wood chips, sand, sintered/powdered metal, plastic and metal pellets, rock and mineral cmshings, carbon fines, grain products, pulverized coal, chalk, coal and coal ash, catalyst and petroleum coke fines, mist entrained off of various processing units and liquid components from scmbbing and drilling operations. They have even been applied to separate foam into its component gas and liquid phases in recent years.

Thanks to high-speed computers and advanced algorithms, the important field of modelling multiphase flows is an area of rapid growth. This one-stop account - now in paperback, with corrections from the first printing - is the ideal way to get to grips with this topic, which has significant applications in industry and nature. Each chapter is written by an acknowledged expert and includes exten-

sive references to current research. All of the chapters are essentially independent and so the book can be used for a range of advanced courses and the self-study of specific topics. No other book covers so many topics related to multiphase flow, and it will therefore be warmly welcomed by researchers and graduate students of the subject across engineering, physics, and applied mathematics.

This book highlights recent findings in industrial, manufacturing and mechanical engineering, and provides an overview of the state of the art in these fields, mainly in Russia and Eastern Europe. A broad range of topics and issues in modern engineering are discussed, including the dynamics of machines and working processes, friction, wear and lubrication in machines, surface transport and technological machines, manufacturing engineering of industrial facilities, materials engineering, metallurgy, control systems and their industrial applications, industrial mechatronics, automation and robotics. The book gathers selected papers presented at the 5th International Conference on Industrial Engineering (ICIE), held in Sochi, Russia in March 2019. The authors are experts in various fields of engineering, and all papers have been carefully reviewed. Given its scope, the book will be of interest to a wide readership, including mechanical and production engineers, lecturers in engineering disciplines, and engineering graduates.

This volume contains a selection of papers presented at the 7th Nirma University International Conference on Engineering 'NUIICONE 2019'. This conference followed the successful organization of four national conferences and six international conferences in previous years. The main theme of the conference was "Technologies for Sustainable Development", which is in line with the "SUSTAINABLE DEVELOPMENT GOAL" established by the United Nations. The conference was organized with many inter-disciplinary technical themes encompassing a broad range of disciplines and enabling researchers, academicians and practitioners to choose between ideas and themes. Besides, NUIICONE-2019 has also presented an exciting new set of events to engage practicing engineers, technologists and technopreneurs from industry through special knowledge sharing sessions involving applied technical papers based on case-study applications, white-papers, panel discussions, innovations and technology products. This proceedings will definitely provide a platform to proliferate new findings among researchers. Advances in Transportation Engineering Emerging Trends in Water Resources and Environmental Engineering Construction Technology and Management Concrete and Structural Engineering Futuristic Power System Control of Power Electronics Converters, Drives and E-mobility Advanced Electrical Machines and Smart Apparatus Chemical Process Development and Design Technologies and Green Environment Sustainable Manufacturing Processes Design and Analysis of Machine and Mechanism Energy Conservation and Management Advances in Networking Technologies Machine Intelligence / Computational Intelligence Autonomic Computing Control and Automation Electronic Communications Electronics Circuits and System Design Signal Processing

This book consists of select proceedings of the International Conference on Emerging Trends in Mechanical and Industrial Engineering (ICETMIE) 2019. It covers current trends in thermal, design, industrial, production and other sub-disciplines of mechanical engineering. This volume focuses on different areas of design engineering including computational mechanics, computational fluid dynamics, finite elements in modelling, simulation, analysis and design, kinematics and dynamics of rigid bodies, micro- and nano-mechanics, solid mechanics and structural mechanics, vibration and acoustics, applied mechanics, and biomechanics. It also covers various topics from thermal engineering including refrigeration plants, heat exchangers, heat pumps and heat pipes, combined heat and power and advanced alternative cycles, polygeneration, combustion processes, heat transfer, solar cells, solar thermal power plants, and the integration of renewable energy with conventional processes. This book will be useful for students, researchers as well as professionals working in the area of mechani-

cal engineering, especially thermal engineering and engineering design and other allied areas.

Over the past few decades, exciting developments have taken place in the field of combustion technology. The present edited volume intends to cover recent developments and provide a broad perspective of the key challenges that characterize the field. The target audience for this book includes engineers involved in combustion system design, operational planning and maintenance. Manufacturers and combustion technology researchers will also benefit from the timely and accurate information provided in this work. The volume is organized into five main sections comprising 15 chapters overall: - Coal and Biofuel Combustion - Waste Combustion - Combustion and Biofuels in Reciprocating Engines - Chemical Looping and Catalysis - Fundamental and Emerging Topics in Combustion Technology

Solid-Liquid Separation, Third Edition reviews the equipment and principles involved in the separation of solids and liquids from a suspension. Some important aspects of solid-liquid separation such as washing, flotation, membrane separation, and magnetic separation are discussed. This book is comprised of 23 chapters and begins with an overview of solid-liquid separation processes and the principles involved, including flotation, gravity sedimentation, cake filtration, and deep bed filtration. The following chapters focus on the characterization of particles suspended in liquids; the efficiency of separation of particles from fluids; coagulation and flocculation; gravity thickening; and the operating characteristics, optimum design criteria, and applications of hydrocyclones. The reader is also introduced to various solid-liquid separation processes such as centrifugal sedimentation, screening, and filtration, along with the use of filter aids. Countercurrent washing of solids and problems associated with fine particle recycling are also considered. The final chapter is devoted to the thermodynamics of particle-fluid interaction. This monograph will be useful to chemical engineers and process engineers, particularly those in plant operation, plant design, or equipment testing and commissioning. It can also be used as a textbook for both undergraduate and postgraduate students.

In this Special Issue, one review paper highlights the necessity of multiscale CFD, coupling micro- and macro-scales, for exchanging information at the interface of the two scales. Four research papers investigate the hydrodynamics, heat transfer, and chemical reactions of various processes using Eulerian CFD modeling. CFD models are attractive for industrial applications. However, substantial efforts in physical modeling and numerical implementation are still required before their widespread implementation.

- Explains operation and scientific fundamentals of circulating fluidized bed (CFB) boilers
- Outlines practical issues in industrial use
- Teaches how to optimize design for maximum reliability and efficiency
- Discusses operating and maintenance issues and how to troubleshoot them

This book provides practicing engineers and students with insight into the design and operation of circulating fluidized bed (CFB) boilers through a combination of theoretical concepts and practical experience. An emphasis on combustion, hydrodynamics, heat transfer, and material issues illustrates these concepts with numerous examples from actual operating plants. The relevance of design and feed-stock parameters to the operation of a CFB boiler are also examined, along with their impacts on designs of mechanical components, including cyclones, air distributor grids, and solid recycle systems. This versatile resource explains how fluidized bed equipment works and how the basic principles of thermodynamics and fluid mechanics influence design, while providing insight into planning new projects, troubleshooting existing equipment, and appreciating the capabilities and limitations of the process. From hydrodynamics to construction and maintenance, the author covers all of the essential information needed to understand, design, operate, and maintain a complete fluidized bed system. It is a must for clean coal technology as well as for biomass power generation.