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FE482M - JIMENEZ YOSEF

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.

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 crushings, 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 scrubbing and drilling operations. They have even

been applied to separate foam into its component gas and liquid phases in recent years.

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

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.

This work introduces the fundamental background necessary to understand polymer devolatilization. It elucidates the actual mechanisms by which the devolatilization of polymer melts progresses, and discusses virtually every type of devolatilization equipment available. The work also addresses devolatilization in various geometries and types of equipment, describing the use of falling strand, slit, single-screw, co-rotating and counter-rotating twin-screw devolatilization.

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 poly-

mer 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.

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 (Elaine 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 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

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 plastics 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.

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 im-

pacts 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.

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.

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

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.

Pneumatic conveying is a technique that is widely used in many industrial mechanical and chemical applications. In the case of cement manufacturing pneumatic conveying is a large scale operation moving several kilograms of material per second which consumes electrical energy (operation of fans) and money (replac-

ment of filters to remove particles from the air). At St Mary's Cement the pneumatic conveying line was studied with a CFD model. The treatment of the secondary solid phase was done with the DPM formulation in ANSYS Fluent and turbulence was modelled with k- SST. Some modifications and alterations to the system are suggested to improve the overall pressure drop. It was found that simple geometric alterations could reduce the pressure drop significantly while larger alterations such as the addition of a cyclone separator could increase the pressure drop over 50% and achieve a monetary savings by the increasing the life of the filters.

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 extensive 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 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 pro-

cessing 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 flow-sheets with multivariate population balances.

This volume contains a selection of papers presented at the 7th Nirma University International Conference on Engineering 'NUI-CONE 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, NUI-CONE-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

Useful as a reference for engineers in industry and as an advanced level text for graduate engineering students, Multiphase Flow and Fluidization takes the reader beyond the theoretical to demonstrate how multiphase flow equations can be used to provide applied, practical, predictive solutions to industrial fluidization problems. Written to help advance progress in the emerging science of multiphase flow, this book begins with the development of the conservation laws and moves on through kinetic theory, clarifying many physical concepts (such as particulate viscosity and solids pressure) and introducing the new dependent variable--the volume fraction of the dispersed phase. Exercises at the end of each chapter are provided for further study and lead into applications not covered in the text itself. Treats fluidization as a branch of transport phenomena Demonstrates how to do transient, multidimensional simulation of multiphase processes The first book to apply kinetic theory to flow of particulates Is the only book to discuss numerical stability of multiphase equations and whether or not such equations are well-posed Explains the origin of bubbles and the concept of critical granular flow Presents clearly written exercises at the end of each chapter to facilitate understanding and further study

Progress in Filtration and Separation contains reference content on fundamentals, core principles, technologies, processes, and applications. It gives detailed coverage of the latest technologies

and research, models, applications and standards, practical implementations, case studies, best practice, and process selection. Extensive worked examples are included that cover basic calculations through to process design, including the effects of key variables. Techniques and topics covered include pervaporation, electrodialysis, ion exchange, magnetic (LIMS, HIMS, HGMS), ultrasonic, and more. Solves the needs of university based researchers and R&D engineers in industry for high-level overviews of sub-topics within the solid-liquid separation field Provides insight and understanding of new technologies and methods Combines the expertise of several separations experts

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.

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.

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.

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

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 micro-

plastics. 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 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.

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.

Today's wind energy industry is at a crossroads. Global economic instability has threatened or eliminated many financial incentives that have been important to the development of specific markets. Now more than ever, this essential element of the world energy mosaic will require innovative research and strategic collaborations to bolster the industry as it moves forward. This text details topics fundamental to the efficient operation of modern commercial farms and highlights advanced research that will enable next-generation wind energy technologies. The book is organized into three sections, Inflow and Wake Influences on Turbine Performance, Turbine Structural Response, and Power Conversion, Control and Integration. In addition to fundamental concepts, the reader will be exposed to comprehensive treatments of topics like wake dynamics, analysis of complex turbine blades, and power electronics in small-scale wind turbine systems.

An analysis of the vortex flow in a particle filtration device, known as a cyclone separator, was performed via computational and experimental models. Optical measurements were taken using pressure-sensitive paint (PSP) to capture the pressure field along the cone of a cyclone separator. An in-situ calibration method was utilized to offset the error induced via viscous heating of the fluid.

The pressure drop, captured with both physical wall pressure taps and through PSP measurements, was much lower than expected when compared to Shephard and Lapple pressure drop theory. Conversely, the pressure drop along the cone wall predicted in the closed configuration computational fluid dynamics (CFD) model agrees in magnitude with the experimental data, although a bulk shift in the pressure level is present. Using a commercial computational fluid dynamics solver ANSYS Fluent, a Reynolds Stress Model was used to capture the anisotropic turbulence present in the cyclone separator. For computational analysis, two configurations were modeled. An open configuration, with a "once-through" vortex structure, was simulated and yielded drastically modified vortex flow characteristics compared to those from the literature. An additional closed configuration simulation was completed, which produced the typical reversed-flow vortex present in most cyclone separators. The results from the closed configuration model show good agreement with experimental and computational data from the literature. The closed configuration model produced tangential velocities approximately two and a half times greater than the supplied inlet velocity with a corresponding velocity profile following the typical Rankine vortex expected in cyclone flow. Analysis of the form of the free-vortex flow shows the CFD results following an inverse-power law relation between tangential velocity and radial position within the ranges expected from the literature. Furthermore, inspection of the unsteadiness present in the flow shows peaks near the unsteady precessing vortex core (PVC). A helical structure is also present in the flow giving an indication of a periodic internal flow structure.

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.

The 21st century is characterized as an era of natural resource depletion, and humanity is faced with several threats due to the

lack of food, energy, and water. Climate change and sea-level rise are at unprecedented levels, being phenomena that make predicting the future of ocean resources more complicated. Oceans contain a limitless amount of water with small (but finite) temperature differences from their surfaces to their floors. To advance the utilization of ocean resources, this book readdresses the past achievements, present developments, and future progress of ocean thermal energy, from basic sciences to sociology and cultural aspects.

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 presents the select proceedings of the second International Conference on Recent Advances in Mechanical Engineering (RAME 2020). The topics covered include aerodynamics and fluid mechanics, automation, automotive engineering, composites, ceramics and polymers processing, computational mechanics, failure and fracture mechanics, friction, tribology and surface engineering, heating and ventilation, air conditioning system, industrial engineering, IC engines, turbomachinery and alternative fuels, machinability and formability of materials, mechanisms and machines, metrology and computer-aided inspection, micro- and

nano-mechanics, modelling, simulation and optimization, product design and development, rapid manufacturing technologies and prototyping, solid mechanics and structural mechanics, thermodynamics and heat transfer, traditional and non-traditional machining processes, vibration and acoustics. The book also discusses various energy-efficient renewable and non-renewable resources and technologies, strategies and technologies for sustainable development and energy & environmental interaction. The book is a valuable reference for beginners, researchers, and professionals interested in sustainable construction and allied fields.

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 present 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 num-

ber 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.

Advances in Clean Energy: Production and Application supports sustainable clean energy technology and green fuel for clean combustion by reviewing the pros and cons of currently available technologies specifically for biodiesel production from biomass

sources, recent fuel modification strategy, low-temperature combustion technology, including other biofuels as well. Written for researchers, graduate students, and professionals in mechanical engineering, chemical engineering, energy, and environmental engineering, this book: Covers global energy scenarios and future energy demands pertaining to clean energy technologies Provides systematic and detailed coverage of the processes and technologies used for biofuel production Includes new technologies and perspectives, giving up-to-date and state-of-the-art information on research and commercialization Discusses all conversion methods including biochemical and thermochemical Examines the environmental consequences of biomass-based biofuel use