

Optimization Of Industrial Unit Processes Second Edition

Provides aspiring engineers with pertinent information and technological methodologies on how best to manage industry's modern-day environment concerns. This book explains why industrial environmental management is important to human environmental interactions and describes what the physical, economic, social, and technological constraints to achieving the goal of a sustainable environment are. It emphasizes recent progress in life-cycle sustainable design, applying green engineering principles and the concept of Zero Effect Zero Defect to minimize wastes and discharges from various manufacturing facilities. Its goal is to educate engineers on how to obtain an optimum balance between environmental protections, while allowing humans to maintain an acceptable quality of life. *Industrial Environmental Management: Engineering, Science, and Policy* covers topics such as industrial wastes, life cycle sustainable design, lean manufacturing, international environmental regulations, and the assessment and management of health and environmental risks. The book also looks at the economics of manufacturing pollution prevention; how eco-industrial parks and process intensification will help minimize waste; and the application of green manufacturing principles in order to minimize wastes and discharges from manufacturing facilities. Provides end-of-chapter questions along with a solutions manual for adopting professors. Covers a wide range of interdisciplinary areas that makes it suitable for different branches of engineering such as wastewater management and treatment; pollutant sampling; health risk assessment; waste minimization; lean manufacturing; and regulatory information. Shows how industrial environmental management is connected to areas like sustainable engineering, sustainable manufacturing, social policy, and more. Contains theory, applications, and real-world problems along with their solutions. Details waste recovery systems. *Industrial Environmental Management: Engineering, Science, and Policy* is an ideal textbook for junior and senior level students in multidisciplinary engineering fields such as chemical, civil, environmental, and petroleum engineering. It will appeal to practicing engineers seeking information about sustainable design principles and methodology.

Energy Optimization in Process Systems and Fuel Cells, Second Edition covers the optimization and integration of energy systems, with a particular focus on fuel cell technology. With rising energy prices, imminent energy shortages, and increasing environmental impacts of energy production, energy optimization and systems integration is critically important. The book applies thermodynamics, kinetics and economics to study the effect of equipment size, environmental parameters, and economic factors on optimal power production and heat integration. Author Stanislaw Sieniutycz, highly recognized for his expertise and teaching, shows how costs can be substantially reduced, particularly in utilities common in the chemical industry. This second edition contains substantial revisions, with particular focus on the rapid progress in the field of fuel cells, related energy theory, and recent advances in the optimization and control of fuel cell systems. New information on fuel cell theory, combined with the theory of flow energy systems, broadens the scope and usefulness of the book. Discusses engineering applications including power generation, resource upgrading, radiation conversion, and chemical transformation in static and dynamic systems. Contains practical applications of optimization methods that help solve the problems of power maximization and optimal use of energy and resources in chemical, mechanical, and environmental engineering.

The origin of any industrial optimization study lies in the theory that some improvement can be made in a controllable system. The possibility for improvements may arise in any context, for example, in the control of a chemical plant, the organization of production to meet delivery dates, the design of rubber compounds, in traffic signal settings, and so on. In this volume, T. A. J. Nicholson deals with applications of the industrial optimization techniques demonstrated in the first volume of this two-part project, *Optimization in Industry: Optimization Techniques*. Applications are classified by their main functional areas in industrial planning, design, and control. The fields covered are machine sequencing, stock control and scheduling, plant renewal, distribution, financial problems, and chemical process control and design. These last two, in particular, are subjects often overlooked in operations research curricula. In each field the place and status of optimization techniques is first described and then a wide range of realistic case studies and examples are reviewed, many of them international. The problems given in this volume are primarily concerned with formulation not with solution; the task is to formulate the problems to be solved by one or more of the methods described in volume one. By connecting the optimization techniques with their applications, the gap between the people devising the methods and the people who actually need to use them is bridged. As with the first volume, this text is also supported by new exercises and model answers making this book important as an introduction to the application of optimization techniques for students as well as a reference work for the practitioner. T. A. J. Nicholson is senior lecturer at the London School of Business Studies with research and consulting interests in industrial control systems.

In *Optimization of Industrial Unit Processes*, the term "optimization" means the maximizing of productivity and safety while minimizing operating costs. In a fully optimized plant, efficiency and productivity are continuously maximized while levels, temperatures, pressures, or flows float within their allowable limits. This control philosophy differs from earlier approaches - where levels and temperatures were controlled at constant values, and plant productivity was only an accidental, uncontrolled consequence of those controlled variables. With this approach, the sides of a multivariable control envelope are the various constraints while inside the envelope the process is continuously moved to maximize efficiency and productivity. Because one must understand a process before one can control it (let alone optimize it), *Optimization of Industrial Unit Processes* discusses the "personality" and characteristics of each process in terms of its time constants, gains, and other unique features. This book provides information for engineers who design or operate industrial plants and who seek to increase the profitability of their plants. It recognizes that all industrial processes involve operations such as material transportation, heat transfer, and reactions. Therefore each plant consists of a combination of basic unit operations and can be optimized by maximizing the efficiency, and minimizing the operating cost, of the individual unit operations from which it is composed. *Optimization of Industrial Unit Processes* discusses real world processes - where pipes leak, sensors plug, and pumps cavitate - offering practical solutions to real problems. Each control system described in the book works, illustrating the state of the art in controlling a particular unit operation. This second edition reflects the continual improvement and evolution of control systems as well as anticipates future advances. Béla G. Lipták speaks on Post-Oil Energy Technology on the AT&T Tech Channel.

This book has been planned and written by Dr. Hine with his knowledge and experience in electrochemical science and engineering for over thirty years since he joined with me at Kyoto University in 1948. This book is unique and is useful for engineers as well as scientists who are going to work in any interdisciplinary field connected with electrochemistry. Science is sure to clarify the truth of nature as well as bring prosperity and an improvement to the welfare of human beings. The origin of the

word "science" is the same as of "conscience," which means the truth of our heart. When we consider a scientific and technological subject, first we classify it into the components and/or factors involved, and then we clarify them individually. Second, we combine them to grasp the whole meaning and feature of the subject under discussion. Computers may help us greatly, but how to establish the software that will be most desirable for our purposes is of great importance. We need to make these efforts ourselves, and not decorate with borrowed plumes. With this concept in mind, this book is attractive because the author describes the basic science in electrochemistry and practice, and discusses the electrochemical engineering applications as a combination of science and technology.

This book presents the concepts and algorithms of advanced industrial process control and on-line optimization within the framework of a multilayer structure. It describes the interaction of three separate layers of process control: direct control, set-point control, and economic optimization. The book features illustrations of the methodologies and algorithms by worked examples and by results of simulations based on industrial process models.

Control and Dynamic Systems, Volume 37: Advances in Industrial Systems provides an overview of the state of knowledge in industrial systems. This volume contains nine chapters and begins with a paper on the objective measures used to characterize the performance of computers which control critical processes. This is followed by separate chapters on the design of automotive power train control systems; control techniques in the pulp and paper industry; developments production scheduling research and practice; a general model-based failure detection and diagnosis methodology; and the application of model-predictive control techniques to problems with several input and output variables. Subsequent chapters deal with techniques for dealing with the problem of providing a complete, coherent, and reliable data base from a collection of switch and breaker status data and measurements; systematic approaches to modifying a finite element model; and optimization techniques in industrial chemical systems. The contributions in this volume will provide a unique and significant reference source for practicing professionals as well as those involved with advancing the state of the art.

Catalysis is central to the chemical industry, as it is directly or involved in the production of almost all useful chemical products. In this book the authors, present the definitive account of industrial catalytic processes. Throughout Fundamentals of Industrial Catalytic Processes the information is illustrated with many case studies and problems. This book is valuable to anyone wanting a clear account of industrial catalytic processes, but is particularly useful to industrial and academic chemists and engineers and graduate working on catalysis. This book also: Covers fundamentals of catalytic processes, including chemistry, catalyst preparation, properties and reaction engineering. Addresses heterogeneous catalytic processes employed by industry. Provides detailed data on existing catalysts and catalytic reactions, process design and chemical engineering. Covers catalysts used in fuel cells.

Unsurpassed in its coverage, usability, and authority since its first publication in 1969, the three-volume Instrument Engineers' Handbook continues to be the premier reference for instrument engineers around the world. It helps users select and implement hundreds of measurement and control instruments and analytical devices and design the most cost-effective process control systems that optimize production and maximize safety. Now entering its fourth edition, Volume 1: Process Measurement and Analysis is fully updated with increased emphasis on installation and maintenance consideration. Its coverage is now fully globalized with product descriptions from manufacturers around the world. Béla G. Lipták speaks on Post-Oil Energy Technology on the AT&T Tech Channel.

By far the most commonly encountered and energy-intensive unit operation in almost all industrial sectors, industrial drying continues to attract the interest of scientists, researchers, and engineers. The Handbook of Industrial Drying, Fourth Edition not only delivers a comprehensive treatment of the current state of the art, but also serves as a consultative reference for streamlining industrial drying operations. New to the Fourth Edition: Computational fluid dynamic simulation Solar, impingement, and pulse combustion drying Drying of fruits, vegetables, sugar, biomass, and coal Physicochemical aspects of sludge drying Life-cycle assessment of drying systems Covering commonly encountered dryers as well as innovative dryers with future potential, the Handbook of Industrial Drying, Fourth Edition not only details the latest developments in the field, but also explains how improvements in dryer design and operation can increase energy efficiency and cost-effectiveness.

This comprehensive book examines the technology and practical applications of plant multivariable envelope control. Optimize plant productivity, including air handlers, boilers, chemical reactors, chillers, clean-rooms, compressors and fans, cooling towers, heat exchangers, and pumping stations. Béla G. Lipták speaks on Post-Oil Energy Technology on the AT&T Tech Channel.

This third edition of the Instrument Engineers' Handbook-most complete and respected work on process instrumentation and control-helps you:

The global food industry has the largest number of demanding and knowledgeable consumers: the world population of seven billion inhabitants, since every person eats! This population requires food products that fulfill the high quality standards established by the food industry organizations. Food shortages threaten human health and are aggravated by the disastrous, extreme climatic events such as floods, droughts, fires, storms connected to climate change, global warming and greenhouse gas emissions that modify the environment and, consequently, the production of foods in the agriculture and husbandry sectors. This collection of articles is a timely contribution to issues relating to the food industry. They were selected for use as a primer, an investigation guide and documentation based on modern, scientific and technical references. This volume is therefore appropriate for use by university researchers and practicing food developers and producers. The control of food processing and production is not only discussed in scientific terms; engineering, economic and financial aspects are also considered for the advantage of food industry managers.

This book is a comprehensive introduction to model predictive control (MPC), including its basic principles and algorithms, system analysis and design methods, strategy developments and practical applications. The main contents of the book include an overview of the development trajectory and basic principles of MPC, typical MPC algorithms, quantitative analysis of classical MPC systems, design and tuning methods for MPC parameters, constrained multivariable MPC algorithms and online optimization decomposition methods. Readers will then progress to more advanced topics such as nonlinear MPC and its related algorithms, the diversification development of MPC with respect to control structures and optimization strategies, and robust MPC. Finally, applications of MPC and its generalization to optimization-based dynamic problems other than control will be discussed. Systematically introduces fundamental concepts, basic algorithms, and applications of MPC Includes a comprehensive overview of MPC development, emphasizing recent advances and modern approaches Features numerous MPC models and structures, based on rigorous research Based on the best-selling Chinese edition, which is a key text in China Predictive Control: Fundamentals and Developments is written for advanced undergraduate and graduate students and researchers specializing in control technologies. It is also a useful reference for industry professionals, engineers, and technicians specializing in advanced optimization control technology.

Since process models are nowadays ubiquitous in many applications, the challenges and alternatives related to their development, validation, and efficient use have become more apparent. In addition, the massive amounts of both offline and online data available today open the door

for new applications and solutions. However, transforming data into useful models and information in the context of the process industry or of bio-systems requires specific approaches and considerations such as new modelling methodologies incorporating the complex, stochastic, hybrid and distributed nature of many processes in particular. The same can be said about the tools and software environments used to describe, code, and solve such models for their further exploitation. Going well beyond mere simulation tools, these advanced tools offer a software suite built around the models, facilitating tasks such as experiment design, parameter estimation, model initialization, validation, analysis, size reduction, discretization, optimization, distributed computation, co-simulation, etc. This Special Issue collects novel developments in these topics in order to address the challenges brought by the use of models in their different facets, and to reflect state of the art developments in methods, tools and industrial applications.

This book is a printed edition of the Special Issue "Real-Time Optimization" that was published in *Processes*. *Modeling, Optimization and Control of Zinc Hydrometallurgical Purification Process* provides a clear picture on how to develop a mathematical model for complex industrial processes, how to design the optimization strategy, and how to apply control methods in order to achieve desired production target. This book shares the authors' recent ideas/methodologies/algorithms on the intelligent manufacturing of complex industry processes, e.g., how to develop a descriptive framework which could enable the digitalization and visualization of a process and how to develop the controller when the process model is not available. Presents an extended state-space descriptive framework for complex industrial processes. Presents scientific problems extracted from real industrial process. Proposes novel modeling and control tools for intelligent manufacturing of continuous industries.

Industrial energy efficiency is one of the most important means of reducing the threat of increased global warming. Research however states that despite the existence of numerous technical energy efficiency measures, its deployment is hindered by the existence of various barriers to energy efficiency. The complexity of increasing energy efficiency in manufacturing industry calls for an interdisciplinary approach to the issue. Improving energy efficiency in industrial energy systems applies an interdisciplinary perspective in examining energy efficiency in industrial energy systems, and discusses how "cross-pollinating" perspectives and theories from the social and engineering sciences can enhance our understanding of barriers, energy audits, energy management, policies, and programmes as they pertain to improved energy efficiency in industry. Apart from classical technical approaches from engineering sciences, Improving energy efficiency in industrial energy systems couples a sociotechnical perspective to increased energy efficiency in industry, showing that industrial energy efficiency can be expected to be shaped by social and commercial processes and built on knowledge, routines, institutions, and methods established in networks. The book can be read by researchers and policy-makers, as well as scholars and practitioners in the field. "This book is extremely valuable for anyone who is designing or executing energy efficiency policies, schemes or projects aiming at SMEs. Both authors deserve the highest respect, and the combination of their expertise makes the results truly unique." - Daniel Lundqvist, programme manager at the Swedish energy agency "For anyone interested in improving energy efficiency in industry, this is a must-read. The book combines tools from social science and engineering to discuss the state of art today as well as possible development path tomorrow. This is a compelling book that I find useful both in my teaching and my research." - Kajsa Ellegård, Professor at Linköping University, Sweden "The book Improving energy efficiency in industrial energy systems is a novel approach on how improved levels of energy efficiency can be reached in industrial energy systems by merging engineering with social sciences. It is with delight that I can recommend their book to anyone interested in the field." - Mats Söderström, Director Energy Systems Programme, Linköping University, Sweden

27th European Symposium on Computer Aided Process Engineering, Volume 40 contains the papers presented at the 27th European Society of Computer-Aided Process Engineering (ESCAPE) event held in Barcelona, October 1-5, 2017. 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 27th European Society of Computer-Aided Process Engineering (ESCAPE) event

Instrument Engineers' Handbook, Third Edition: Process Control provides information pertinent to control hardware, including transmitters, controllers, control valves, displays, and computer systems. This book presents the control theory and shows how the unit processes of distillation and chemical reaction should be controlled. Organized into eight chapters, this edition begins with an overview of the method needed for the state-of-the-art practice of process control. This text then examines the relative merits of digital and analog displays and computers. Other chapters consider the basic industrial annunciators and other alarm systems, which consist of multiple individual alarm points that are connected to a trouble contact, a logic module, and a visual indicator. This book discusses as well the data loggers available for process control applications. The final chapter deals with the various pump control systems, the features and designs of variable-speed drives, and the metering pumps. This book is a valuable resource for engineers.

In *Optimization of Industrial Unit Processes*, the term "optimization" means the maximizing of productivity and safety while minimizing operating costs. In a fully optimized plant, efficiency and productivity are continuously maximized while levels, temperatures, pressures, or flows float within their allowable limits. This control philosophy differs from earlier approaches - where levels and temperatures were controlled at constant values, and plant productivity was only an accidental, uncontrolled consequence of those controlled variables. With this approach, the sides of a multivariable control envelope are the various constraints while inside the envelope the process is continuously moved to maximize efficiency and productivity. Because one must understand a process before one can control it (let alone optimize it), *Optimization of Industrial Unit Processes* discusses the "personality" and characteristics of each process in term of its time constants, gains, and other unique features. This book provides information for engineers who design or operate industrial plants and who seek to increase the profitability of their plants. It recognizes that all industrial processes involve operations such as material transportation, heat transfer, and reactions. Therefore each plant consists of a combination of basic unit operations and can be optimized by maximizing the efficiency, and minimizing the operating cost, of the individual unit operations from which it is composed. *Optimization of Industrial Unit Processes* discusses real world processes - where pipes leak, sensors plug, and pumps cavitate - offering practical solutions to real problems. Each control system described in the book works, illustrating the state of the art in controlling a particular unit operation. This second edition reflects the continual improvement and evolution of control systems as well as anticipates future advances. Bela G. Liptak speaks on Post-Oil Energy Technology on the AT&T Tech Channel.

Ullmann's Processes and Process Engineering is tailor-made for anyone interested in industrial chemical processes, unit operations, process engineering, reactor design and optimization. Based on the very latest edition of the 40-volume Ullmann's

Encyclopedia of Industrial Chemistry, the contents represent an up-to-date source of information. The detailed and thoroughly edited articles are written by renowned experts from industry and academia. The three volumes provide coverage on all aspects of processes and process engineering. The major headings are: Separation Processes Separation and Classification Mixing Particle Technology Heat Generation Processes under Special Conditions Principles of Process Engineering Reactor Types A keyword index and an author index complete the contents of this handbook. Top-quality illustrations, clear diagrams and charts combined with the extensive use of tables enhance the presentation and provide a unique level of detail. Thus, this handbook is an invaluable and convenient source of information for chemical engineers, chemists, patent attorneys, marketing manager and all those involved in the chemical process industry.

Despite the vast research on energy optimization and process integration, there has to date been no synthesis linking these together. This book fills the gap, presenting optimization and integration in energy and process engineering. The content is based on the current literature and includes novel approaches developed by the authors. Various thermal and chemical systems (heat and mass exchangers, thermal and water networks, energy converters, recovery units, solar collectors, and separators) are considered. Thermodynamics, kinetics and economics are used to formulate and solve problems with constraints on process rates, equipment size, environmental parameters, and costs. Comprehensive coverage of dynamic optimization of energy conversion systems and separation units is provided along with suitable computational algorithms for deterministic and stochastic optimization approaches based on: nonlinear programming, dynamic programming, variational calculus, Hamilton-Jacobi-Bellman theory, Pontryagin's maximum principles, and special methods of process integration. Integration of heat energy and process water within a total site is shown to be a significant factor reducing production costs, in particular costs of utilities for the chemical industry. This integration involves systematic design and optimization of heat exchangers and water networks (HEN and WN). After presenting basic, insight-based Pinch Technology, systematic, optimization-based sequential and simultaneous approaches to design HEN and WN are described. Special consideration is given to the HEN design problem targeting stage, in view of its importance at various levels of system design. Selected, advanced methods for HEN synthesis and retrofit are presented. For WN design a novel approach based on stochastic optimization is described that accounts for both grassroots and revamp design scenarios. Presents a unique synthesis of energy optimization and process integration that applies scientific information from thermodynamics, kinetics, and systems theory Discusses engineering applications including power generation, resource upgrading, radiation conversion and chemical transformation, in static and dynamic systems Clarifies how to identify thermal and chemical constraints and incorporate them into optimization models and solutions

This volume describes the characteristics of processes used in petroleum refining: upgrading light fractions (reforming and isomerization), converting distillates (catalytic cracking, hydrocracking, and associated equipment), converting residues (visbreaking, coking hydroconversion), and reducing air and water pollution (white product sweetening, acid gas, stack gas, and waste water treatment). This book is available in French Under the title "le raffinage du pétrole. Tome 3. Procédés de transformation". Contents : 1. Introduction. 2. Basic principles governing chemical changes. 3. Industrial catalysts. 4. Catalytic reforming. 5. Catalytic cracking. 6. Isomerization of light paraffins. 7. Aliphatic alkylation. 8. Olefin etherification. 9. Oligomerization. 10. Hydrocracking. 11. Visbreaking of residues. 12. Coking. 13. Residue hydroconversion. 14. Hydrogen production. 15. White products refining by sweetening. 16. Hydrotreating. 17. Acid gas treatment. 18. Desulfurization of stack gases. 19. Water treatment. References. Index.

Product and Process Design: Driving Innovation is a comprehensive textbook for students and industrial professionals. It treats the combined design of innovative products and their innovative manufacturing processes, providing specific methods for BSc, MSc, PDEng and PhD courses. Students, industrial innovators and managers are guided through all design steps in all innovation stages (discovery, concept, feasibility, development, detailed engineering, and implementation) to successfully obtain novel products and their novel processes. The authors' decades of innovation experience in industry, as well as in teaching BSc, MSc, and post-academic product and process design courses, thereby including the latest design publications, culminate in this book.

This book discusses conventional as well as unconventional wood drying technologies. It covers fundamental thermophysical and energetic aspects and integrates two complex thermodynamic systems, conventional kilns and heat pumps, aimed at improving the energy performance of dryers and the final quality of dried lumber. It discusses advanced components, kiln energy requirements, modeling, and software and emphasizes dryer/heat pump optimum coupling, control, and energy efficiency. Problems are included in most chapters as practical, numerical examples for process and system/components calculation and design. The book presents promising advancements and R&D challenges and future requirements.

"Process Plant Equipment Book is another great publication from Wiley as a reference book for final year students as well as those who will work or are working in chemical production plants and refinery..." -Associate Prof. Dr. Ramli Mat, Deputy Dean (Academic), Faculty of Chemical Engineering, Universiti Teknologi Malaysia "...give[s] readers access to both fundamental information on process plant equipment and to practical ideas, best practices and experiences of highly successful engineers from around the world... The book is illustrated throughout with numerous black & white photos and diagrams and also contains case studies demonstrating how actual process plants have implemented the tools and techniques discussed in the book. An extensive list of references enables readers to explore each individual topic in greater depth..." -Stainless Steel World and Valve World, November 2012 Discover how to optimize process plant equipment, from selection to operation to troubleshooting From energy to pharmaceuticals to food, the world depends on processing plants to manufacture the products that enable people to survive and flourish. With this book as their guide, readers have the information and practical guidelines needed to select, operate, maintain, control, and troubleshoot process plant equipment so that it is efficient, cost-effective, and reliable throughout its lifetime. Following the authors' careful explanations and instructions, readers will find that they are better able to reduce downtime and unscheduled shutdowns, streamline operations, and maximize the service life of processing equipment. Process Plant Equipment: Operation, Control, and Reliability is divided into three sections: Section One: Process Equipment Operations covers such key equipment as valves, pumps, cooling towers, conveyors, and storage tanks Section Two: Process Plant Reliability sets forth a variety of tested and proven tools and methods to assess and ensure the reliability and mechanical integrity of process equipment, including failure analysis, Fitness-for-Service assessment, engineering economics for chemical processes, and process component function and performance criteria Section Three: Process Measurement, Control, and Modeling examines flow meters, process control, and process modeling and simulation Throughout the book, numerous photos and diagrams illustrate the operation and control of key process equipment. There are also case studies demonstrating how actual process plants have implemented the tools and techniques discussed in the book. At the end of each chapter, an extensive list of references enables readers to explore each individual topic in greater depth. In summary, this text offers students, process engineers, and plant managers the expertise and technical support needed to streamline and optimize the operation of process plant equipment, from its initial selection to operations to troubleshooting.

The 29th European Symposium on Computer Aided Process Engineering, contains the papers presented at the 29th European Symposium of Computer Aided Process Engineering (ESCAPE) event held in Eindhoven, The Netherlands, from June 16-19, 2019. 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 29th European Symposium of Computer Aided Process Engineering (ESCAPE) event

The Instrument and Automation Engineers' Handbook (IAEH) is the #1 process automation handbook in the world. Volume one of the Fifth Edition, Measurement and Safety, covers safety sensors and the detectors of physical properties. Measurement and Safety is an invaluable resource that: Describes the detectors used in the measurement of process variables Offers application- and method-specific guidance for choosing the best measurement device Provides tables of detector capabilities and other practical information at a glance Contains detailed descriptions of domestic and overseas products, their features, capabilities, and suppliers, including suppliers' web addresses Complete with 163 alphabetized chapters and a thorough index for quick access to specific information, Measurement and Safety is a must-have reference for instrument and automation engineers working in the chemical, oil/gas, pharmaceutical, pollution, energy, plastics, paper, wastewater, food, etc. industries. About the eBook The most important new feature of the IAEH, Fifth Edition is its availability as an eBook. The eBook provides the same content as the print edition, with the addition of thousands of web addresses so that readers can reach suppliers or reference books and articles on the hundreds of topics covered in the handbook. This feature includes a complete bidders' list that allows readers to issue their specifications for competitive bids from any or all potential product suppliers.

An Emerging Tool for Pioneering Engineers Co-published by the International Federation of Heat Treatment and Surface

Engineering. Thermal processing is a highly precise science that does not easily lend itself to improvements through modeling, as the computations required to attain an accurate prediction of the microstructure and properties of work

Exploring methods and techniques to optimize processing energy efficiency in process plants, Energy and Process Optimization for the Process Industries provides a holistic approach that considers optimizing process conditions, changing process flowschemes, modifying equipment internals, and upgrading process technology that has already been used in a process plant with success. Field tested by numerous operating plants, the book describes technical solutions to reduce energy consumption leading to significant returns on capital and includes an 8-point Guidelines for Success. The book provides managers, chemical and mechanical engineers, and plant operators with methods and tools for continuous energy and process improvements.

Hardbound. The subject of this book is the exergy analysis of the efficiency of processes involving energy and matter transformations.

Efficiency is one of the most important criteria used in evaluating the performance of all types of processing plants; in particular those of the energy and chemical industries. The beauty of the exergetic approach to thermodynamic analysis is that it permits a universally applicable definition of efficiency and is free of contradictions in its treatment of numerous and diverse systems. The book provides the reader with the quantitative methods and calculations of efficiency considered to be applicable to different systems and their components. Methods, procedures and instructions for using the efficiency analysis in optimizing the performance of thermal, chemical and other industrial plants are also given. Numerous examples are used in the book to aid the reader in understanding the concepts of efficiency, exergy and their applications.

Industrial Chemical Process Analysis and Design uses chemical engineering principles to explain the transformation of basic raw materials into major chemical products. The book discusses traditional processes to create products like nitric acid, sulphuric acid, ammonia, and methanol, as well as more novel products like bioethanol and biodiesel. Historical perspectives show how current chemical processes have developed over years or even decades to improve their yields, from the discovery of the chemical reaction or physico-chemical principle to the industrial process needed to yield commercial quantities. Starting with an introduction to process design, optimization, and safety, Martin then provides stand-alone chapters—in a case study fashion—for commercially important chemical production processes. Computational software tools like MATLAB®, Excel, and Chemcad are used throughout to aid process analysis. Integrates principles of chemical engineering, unit operations, and chemical reactor engineering to understand process synthesis and analysis Combines traditional computation and modern software tools to compare different solutions for the same problem Includes historical perspectives and traces the improving efficiencies of commercially important chemical production processes Features worked examples and end-of-chapter problems with solutions to show the application of concepts discussed in the text

This book covers a wide variety of topics related to the application of experimental methods, in addition to the pedagogy of chemical engineering laboratory unit operations. The purpose of this book is to create a platform for the exchange of different experimental techniques, approaches and lessons, in addition to new ideas and strategies in teaching laboratory unit operations to undergraduate chemical engineering students. It is recommended for instructors and students of chemical engineering and natural sciences who are interested in reading about different experimental setups and techniques, covering a wide range of scales, which can be widely applied to many areas of chemical engineering interest. The book documents 25 papers collected from the Special Issue "Advances in Condition Monitoring, Optimization and Control for Complex Industrial Processes", highlighting recent research trends in complex industrial processes. The book aims to stimulate the research field and be of benefit to readers from both academic institutes and industrial sectors. This book promotes the benefits of the development and application of energy information and control systems. This wave of information technology (IT) and web-based energy information and control systems (web based EIS/ECS) continues to roll on with increasing speed and intensity. This handbook presents recent technological advancements in the field, as well as a compilation of the best information from three previous books in this area. The combined thrust of this information is that the highest level functions of the building and facility automation system are delivered by a web based EIS/ECS system that provides energy management, facility management, overall facility operational management and ties in with the enterprise resource management system for the entire facility or the group of facilities being managed.

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