
Chemical Reactor Design Optimization And Scaleup 2nd Edition

Optimization in Chemical Engineering
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Chemical Reactor Design
Heterogeneous Reactor Design
Chemical Reaction Engineering and Reactor Technology
Advanced Membrane Technology and Applications
Chemical Reaction and Reactor Design
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Control and Monitoring of Chemical Batch Reactors
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Handbook of Chemical Reactor Design, Optimization, and Scaleup
Principles of Chemical Reactor Analysis and Design
An Introduction to Chemical Engineering Kinetics & Reactor Design
Attainable Region Theory
Chemical Engineering Design
Trickle Bed Reactors
Analysis, Synthesis and Design of Chemical Processes
Systematic Methods of Chemical Process Design
Chemical Process Design and Integration

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Optimization in Chemical Engineering Elsevier

An innovative approach that helps students move from the classroom to professional practice This text offers a comprehensive, unified methodology to analyze and design chemical reactors, using a reaction-based design formulation rather than the common species-based design formulation. The book's acclaimed approach addresses the weaknesses of current pedagogy by giving readers the knowledge and tools needed to address the technical challenges they will face in practice. Principles of Chemical Reactor Analysis and Design prepares readers to design and operate real chemical reactors and to troubleshoot any technical problems that may arise. The text's unified methodology is applicable to both single and multiple chemical reactions, to all reactor configurations, and to all forms of rate expression. This text also . . . Describes reactor operations in terms of dimensionless design equations, generating dimensionless operating curves that depict the progress of individual chemical reactions, the composition of species, and the temperature. Combines all parameters that affect heat transfer into a single dimensionless number that can be estimated a priori. Accounts for all variations in the heat capacity of the reacting fluid. Develops a complete framework for economic-based optimization of reactor operations. Problems at the end of each chapter are categorized by their level of difficulty from one to four, giving readers the opportunity to test and develop their skills. Graduate and advanced undergraduate chemical engineering students will find that this text's unified approach better prepares them for professional practice by teaching them the actual skills needed to design and analyze chemical reactors.

Catalyst Design Butterworth-Heinemann

Over the last 20 years, fundamental design concepts and advanced computer modeling have revolutionized process design for chemical engineering. Team work and creative problem solving are still the building blocks of successful design, but new design concepts and novel mathematical programming models

based on computer-based tools have taken out much of the guess-work. This book presents the new revolutionary knowledge, taking a systematic approach to design at all levels.

Chemical Reactor Design John Wiley & Sons

When this book first appeared in 1981, a reviewer writing in Chemistry in Britain commented I enjoyed reading this book and would recommend it to teachers of the subject...". The book is now available in paperback at less than half the price of the hardcover edition, thus bringing it within the reach of students. Intended as an extension to the normal introductory reactor engineering course, the text is based on a lecture course in practical reactor design and aims to teach students how to design and specify reactors or to know the advanced techniques by which this is done. Reactor design is concerned with many aspects. Hence the text touches on a multitude of disciplines: statistics, economics, optimization, control and safety as well as those subjects traditionally thought of as reactor design. The book includes a set of interactive computer-based exercises which enable the student to discover for himself the major characteristics of the various reactor types. CONTENTS: Chapter 1. Chemical Kinetics and Reactor Design Principles. 2. Modelling of Reactors. 3. Reactor Laboratory Studies in Process Development. 4. The Planning of Experiments. 5. The Pilot Stage. 6.

Heterogeneous Reactor Design John Wiley & Sons

Selecting the best type of reactor for any particular chemical reaction, taking into consideration safety, hazard analysis, scale-up, and many other factors is essential to any industrial problem. An understanding of chemical reaction kinetics and the design of chemical reactors is key to the success of the of the chemist and the chemical engineer in such an endeavor. This valuable reference volume conveys a basic understanding of chemical reactor design methodologies, incorporating control, hazard analysis, and other topics not covered in similar texts. In addition to covering fluid mixing, the treatment of wastewater, and chemical reactor modeling, the author includes sections on safety in chemical reaction and scale-up, two topics that are often neglected or overlooked. As a real-world introduction to the modeling of chemical kinetics and reactor design, the author

includes a case study on ammonia synthesis that is integrated throughout the text. The text also features an accompanying CD, which contains computer programs developed to solve modeling problems using numerical methods. Students, chemists, technologists, and chemical engineers will all benefit from this comprehensive volume. Shows readers how to select the best reactor design, hazard analysis, and safety in design methodology Features computer programs developed to solve modeling problems using numerical methods
Chemical Reaction Engineering and Reactor Technology CRC Press

The classic reference, now expanded and updated Chemical Reactor Design, Optimization, and Scaleup is the authoritative sourcebook on chemical reactors. This new Second Edition consolidates the latest information on current optimization and scaleup methodologies, numerical methods, and biochemical and polymer reactions. It provides the comprehensive tools and information to help readers design and specify chemical reactors confidently, with state-of-the-art skills. This authoritative guide: Covers the fundamentals and principles of chemical reactor design, along with advanced topics and applications Presents techniques for dealing with varying physical properties in reactors of all types and purposes Includes a completely new chapter on meso-, micro-, and nano-scale reactors that addresses such topics as axial diffusion in micro-scale reactors and self-assembly of nano-scale structures Explains the method of false transients, a numerical solution technique Includes suggestions for further reading, problems, and, when appropriate, scaleup or scaledown considerations at the end of each chapter to illustrate industrial applications Serves as a ready reference for explained formulas, principles, and data This is the definitive hands-on reference for practicing professionals and an excellent textbook for courses in chemical reactor design. It is an essential resource for chemical engineers in the process industries, including petrochemicals, biochemicals, microelectronics, and water treatment.

Advanced Membrane Technology and Applications John Wiley & Sons

Chemical Reactor Modeling closes the gap between Chemical Reaction Engineering and Fluid Mechanics. The second edition

consists of two volumes: Volume 1: Fundamentals. Volume 2: Chemical Engineering Applications. In volume 1 most of the fundamental theory is presented. A few numerical model simulation application examples are given to elucidate the link between theory and applications. In volume 2 the chemical reactor equipment to be modeled are described. Several engineering models are introduced and discussed. A survey of the frequently used numerical methods, algorithms and schemes is provided. A few practical engineering applications of the modeling tools are presented and discussed. The working principles of several experimental techniques employed in order to get data for model validation are outlined. The monograph is based on lectures regularly taught in the fourth and fifth years graduate courses in transport phenomena and chemical reactor modeling and in a post graduate course in modern reactor modeling at the Norwegian University of Science and Technology, Department of Chemical Engineering, Trondheim, Norway. The objective of the book is to present the fundamentals of the single-fluid and multi-fluid models for the analysis of single and multiphase reactive flows in chemical reactors with a chemical reactor engineering rather than mathematical bias. Organized into 13 chapters, it combines theoretical aspects and practical applications and covers some of the recent research in several areas of chemical reactor engineering. This book contains a survey of the modern literature in the field of chemical reactor modeling.

Chemical Reaction and Reactor Design Prentice Hall

Chemical Reaction and Reactor Design begins with a discussion of chemical reactions, emphasizing chemical equilibrium and rate of reaction and proceeds to the theory and practice of heat and mass transfer, and important considerations in the design of chemical reactors. The final section of the book provides detailed case studies from the chemical industry covering the six chemical processes: naphtha cracking, steam reforming, epoxy resin production, hydro-treating, fluid catalytic cracking and flue gas desulfurization. The comprehensive coverage of theories of chemical reaction and their application to reactor design provided here will be of value to chemical engineers, industrial chemists and researchers in these fields.

Bioprocess Engineering Gulf Professional Publishing

This volume of case studies serves as a guide and reference manual for the application of engineering science fundamentals in

the solution of chemical development and process design problems. The introductory chapter describes a set of general principles relevant to the analysis of industrial design problems. An extensive bibliography is presented which provides a valuable theoretical and practical basis for proper understanding of the case studies. The six case studies present an opportunity for the detailed application of the broad principles outlined in the introduction. These cases vary widely both in regard to the engineering operations analyzed and with respect to the complexity and detail of the required solution. Three of the analyses result in computer programs which may be utilized for a more comprehensive design evaluation and for student discussion in a "computerized classroom." Each case represents a useful approach to a general class of design studies, and each has been reviewed by an industrial or academic expert familiar with current commercial practice. Therefore, even though the reproduction of specific industrial designs has not been attempted, each solution has been compared and contrasted with the realities of modern industrial operations. Various approaches to the financial evaluation of a chemical project are described. These are presented in some detail since material of this type is frequently absent from academic curricula.

Chemical Reaction Engineering and Reactor Technology, Second Edition John Wiley & Sons

This is the Second Edition of the standard text on chemical reaction engineering, beginning with basic definitions and fundamental principles and continuing all the way to practical applications, emphasizing real-world aspects of industrial practice. The two main sections cover applied or engineering kinetics, reactor analysis and design. Includes updated coverage of computer modeling methods and many new worked examples. Most of the examples use real kinetic data from processes of industrial importance.

Chemical Reactor Design in Practice John Wiley & Sons

Thorough treatment of the design, preparation, and utilization of catalytic systems for optimal performance.

Catalytic Reactors CRC Press

Interest in structured catalysts is steadily increasing due to the already proven, as well as potential, advantages of these catalysts. Updating the comprehensive coverage of the first edition published in 1998 with the latest science and applications,

Structured Catalysts and Reactors, Second Edition gives detailed information on all aspect

Process Intensification John Wiley & Sons

Reactor design for Chemical Engineering deals with maximization of product yields and the net present value for the chemical reaction, optimization of the reaction efficiency, and minimization of costs. This book discusses the best choice of catalysts, different reaction steps and intermediates and the design of the catalytic reactors, in which the catalysis and chemical reaction are combined to achieve intensification.

Chemical Reactor Design Cambridge University Press

Chemical Reactor Design and Control uses process simulators like Matlab®, Aspen Plus, and Aspen Dynamics to study the design of chemical reactors and their dynamic control. There are numerous books that focus on steady-state reactor design. There are no books that consider practical control systems for real industrial reactors. This unique reference addresses the simultaneous design and control of chemical reactors. After a discussion of reactor basics, it: Covers three types of classical reactors: continuous stirred tank (CSTR), batch, and tubular plug flow. Emphasizes temperature control and the critical impact of steady-state design on the dynamics and stability of reactors. Covers chemical reactors and control problems in a plantwide environment. Incorporates numerous tables and shows step-by-step calculations with equations. Discusses how to use process simulators to address diverse issues and types of operations. This is a practical reference for chemical engineering professionals in the process industries, professionals who work with chemical reactors, and students in undergraduate and graduate reactor design, process control, and plant design courses.

Chemical Reactor Design, Optimization, and Scaleup Springer Science & Business Media

Combines the concepts of chemical kinetics, as taught in physical chemistry, with those of transport phenomena taught in engineering courses: fluid flow, heat transfer, and mass transfer, with heavy emphasis on numerical methods and computation. The reader is taught to use and understand modern, computer-aided design techniques (CAD) with emphasis on design optimization. Includes sections on biochemical engineering, electronic materials processing, and multiphase reactions--and provides a chapter on polymer reaction engineering.

Control and Monitoring of Chemical Batch Reactors Рипол
Классик

This book provides a hybrid methodology for engineering of trickle bed reactors by integrating conventional reaction engineering models with state-of-the-art computational flow models. The content may be used in several ways and at various stages in the engineering process: it may be used as a basic resource for making appropriate reactor engineering decisions in practice; as study material for a course on reactor design, operation, or optimization of trickle bed reactors; or in solving practical reactor engineering problems. The authors assume some background knowledge of reactor engineering and numerical techniques. Facilitates development of high fidelity models for industrial applications Facilitates selection and application of appropriate models Guides development and application of computational models to trickle beds

Chemical Reactor Design in Practice Pearson Education

Process Intensification: Engineering for Efficiency, Sustainability and Flexibility is the first book to provide a practical working guide to understanding process intensification (PI) and developing successful PI solutions and applications in chemical process, civil, environmental, energy, pharmaceutical, biological, and biochemical systems. Process intensification is a chemical and process design approach that leads to substantially smaller, cleaner, safer, and more energy efficient process technology. It improves process flexibility, product quality, speed to market and inherent safety, with a reduced environmental footprint. This book represents a valuable resource for engineers working with leading-edge process technologies, and those involved research and development of chemical, process, environmental, pharmaceutical, and bioscience systems. No other reference covers both the technology and application of PI, addressing fundamentals, industry applications, and including a development and implementation guide Covers hot and high growth topics, including emission prevention, sustainable design, and pinch analysis World-class authors: Colin Ramshaw pioneered PI at ICI and is widely credited as the father of the technology

Modeling of Chemical Kinetics and Reactor Design Wiley

Bioprocess Engineering involves the design and development of equipment and processes for the manufacturing of products such as food, feed, pharmaceuticals, nutraceuticals, chemicals, and polymers and paper from biological materials. It also deals with studying various biotechnological processes. "Bioprocess Kinetics and Systems Engineering" first of its kind contains systematic and comprehensive content on bioprocess kinetics, bioprocess systems, sustainability and reaction engineering. Dr. Shijie Liu reviews the relevant fundamentals of chemical kinetics-including batch and continuous reactors, biochemistry, microbiology, molecular biology, reaction engineering, and bioprocess systems engineering- introducing key principles that enable bioprocess engineers to engage in the analysis, optimization, design and consistent control over biological and chemical transformations. The quantitative treatment of bioprocesses is the central theme of this book, while more advanced techniques and applications are covered with some depth. Many theoretical derivations and simplifications are used to demonstrate how empirical kinetic models are applicable to complicated bioprocess systems. Contains extensive illustrative drawings which make the understanding of the subject easy Contains worked examples of the various process parameters, their significance and their specific practical use Provides the theory of bioprocess kinetics from simple concepts to complex metabolic pathways Incorporates sustainability concepts into the various bioprocesses

Chemical Reactor Analysis and Design Cambridge University Press

The role of the chemical reactor is crucial for the industrial conversion of raw materials into products and numerous factors must be considered when selecting an appropriate and efficient chemical reactor. Chemical Reaction Engineering and Reactor Technology defines the qualitative aspects that affect the selection of an industrial chemical reactor and couples various reactor models to case-specific kinetic expressions for chemical processes. Offering a systematic development of the chemical reaction engineering concept, this volume explores: Essential stoichiometric, kinetic, and thermodynamic terms needed in the analysis of chemical reactors Homogeneous and heterogeneous

reactors Residence time distributions and non-ideal flow conditions in industrial reactors Solutions of algebraic and ordinary differential equation systems Gas- and liquid-phase diffusion coefficients and gas-film coefficients Correlations for gas-liquid systems Solubilities of gases in liquids Guidelines for laboratory reactors and the estimation of kinetic parameters The authors pay special attention to the exact formulations and derivations of mass energy balances and their numerical solutions. Richly illustrated and containing exercises and solutions covering a number of processes, from oil refining to the development of specialty and fine chemicals, the text provides a clear understanding of chemical reactor analysis and design.

Chemical Reactor Design, Optimization, and Scaleup

Butterworth-Heinemann

Good, No Highlights, No Markup, all pages are intact, Slight Shelfwear, may have the corners slightly dented, may have slight color changes/slightly damaged spine.

Product and Process Design Principles Newnes

Recipient of the 2019 Most Promising New Textbook Award from the Textbook & Academic Authors Association (TAA). "The authors of Attainable Region Theory: An Introduction to an Choosing Optimal Reactor make what is a complex subject and decades of research accessible to the target audience in a compelling narrative with numerous examples of real-world applications." TAA Award Judges, February 2019 Learn how to effectively interpret, select and optimize reactors for complex reactive systems, using Attainable Region theory Teaches how to effectively interpret, select and optimize reactors for complex reactive systems, using Attainable Region (AR) theory Written by co-founders and experienced practitioners of the theory Covers both the fundamentals of AR theory for readers new to the field, as well as advanced AR topics for more advanced practitioners for understanding and improving realistic reactor systems Includes over 200 illustrations and 70 worked examples explaining how AR theory can be applied to complex reactor networks, making it ideal for instructors and self-study Interactive software tools and examples written for the book help to demonstrate the concepts and encourage exploration of the ideas

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