Fluid Mechanics By Mccabe Smith 6th Edition

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Unit Operations in Food Processing R. L. Earle 2013-10-22 This long awaited second edition of a popular textbook has a simple and direct approach to the diversity and complexity of food processing. It explains the principles of operations and illustrates them by individual processes. The new edition has been enlarged to include sections on freezing, drying, psychrometry, and a completely new section on mechanical refrigeration. All the units have been converted to SI measure. Each chapter contains unworked examples to help the student gain a grasp of the subject, and although primarily intended for the student food technologist or process engineer, this book will also be useful to technical workers in the food industry

Process Engineering and Design Using Visual Basic Arun Datta 2007-10-08 Software tools are a great aid to process engineers, but too much dependence on such tools can often lead to inappropriate and suboptimal designs. Reliance on software is also a hindrance without a firm understanding of the principles underlying its operation, since users are still responsible for devising the design. In Process Engineering

Bioprocess Engineering Principles Pauline M. Doran 2013 This welcome new edition covers bioprocess engineering principles for the reader with a limited engineering background. It explains process analysis from an engineering point of view, using worked examples and problems that relate to biological systems. Application of engineering concepts is illustrated in areas of modern biotechnology such as recombinant protein production, bioremediation, biofuels, drug development, and tissue engineering, as well as microbial fermentation. The main sub-disciplines within the engineering curriculum are all covered; Material and Energy Balances, Transport Processes, Reactions and Reactor Engineering. With new and expanded material, Doran's textbook remains the book of choice for students seeking to move into bioprocess engineering. NEW TO THIS EDITION: All chapters thoroughly revised for current developments, with over 200 pgs of new material, including significant new content in: Metabolic Engineering Sustainable Bioprocessing Membrane Filtration Turbulence and Impeller Design Downstream Processing Oxygen Transfer Systems Over 150 new problems and worked examples More than 100 new illustrations New to this edition: All chapters thoroughly revised for current developments, with over 200 pgs of new material, including significant new content in: Metabolic Engineering Sustainable Bioprocessing Membrane Filtration Turbulence and Impeller Design Downstream Processing Oxygen Transfer Systems Over 150 new problems and worked examples More than 100 new illustrations

圖解輸送現象 吳永富 2020-08-01 輸送現象是工程學、化學、材料科學、農學、氣象學、生理學、生物學、藥學等領域皆會面對的課題，從17世紀即已陸續建立基礎理論。一般探討的輸送現象包括動量輸送、熱量輸送和質量輸送，然而這三種輸送往往不會單獨發生，甚至彼此還會互相影響，因而成為複雜難解的問題。本書除了介紹上述三種輸送現象，也闡述了此領域的內涵、延伸和應用，可作為工程科系學生快速理解相關物理的入門資料。若欲繼續深究輸送現象，首要工作是建立物理模型，形成統御方程式與對應條件，但這些方程式與條件往往涉及微積分和工程數學，因此本書採取循序漸進的系統性方法，簡介輸送現象的推論過程，並也著重應用實例，期望讀者能以本書論點出發，一方面可以理解輸送現象的日常應用，另一方面也能探究輸送現象的研發課題。

Mathematical Modeling of Food Processing Mohammed M. Farid 2010-05-21 Written by international experts from industry, research centers, and academia, Mathematical Modeling of Food Processing discusses the physical and mathematical analysis of transport phenomena associated with food processing. The models presented describe many of the important physical and biological transformations that occur in food during proces

Modeling and Simulation of Chemical Process Systems Nayef Ghasem 2018-11-08 In this textbook, the author teaches readers how to model and simulate a unit process operation through developing mathematical model equations, solving model equations manually, and comparing results with those simulated through software. It covers both lumped parameter systems and distributed parameter systems, as well as using MATLAB and Simulink to solve the system model equations for both. Simplified partial differential equations are solved using COMSOL, an effective tool to solve PDE, using the fine element method. This book includes end of chapter problems and worked examples, and summarizes reader goals at the beginning of each chapter.

Fluid Mechanics and Heat Transfer William Roy Penney 2018-01-31 This practical book provides instruction on how to conduct several "hands-on" experiments for laboratory demonstration in the teaching of heat transfer and fluid dynamics. It is an ideal resource for chemical engineering, mechanical engineering, and engineering technology professors and instructors starting a new laboratory or in need of cost-effective and easy to replicate demonstrations. The book details the equipment required to perform each experiment (much of which is made up of materials readily available is most laboratories), along with the required experimental protocol and safety precautions. Background theory is presented for each experiment, as well as sample data collected by students, and a complete analysis and treatment of the data using correlations from the literature.

Biotechnology Progress 1991

Transport Phenomena Robert S. Brodkey 2003-02 Part II covers applications in greater detail. The three transport phenomena--heat, mass, and momentum transfer--are treated in depth through simultaneous (or parallel) developments.

World of Mathematics Brigham Narins 2001 Presents over 1,000 entries covering theories, discoveries, concepts, and definitions, and includes biographical entries on prominent mathematicians from antiquity to the present.

Chemical Engineering Progress 1994

Handbook of Food and Bioprocess Modeling Techniques Shyam S. Sablani 2006-12-19 With the advancement of computers, the use of modeling to reduce time and expense, and improve process optimization, predictive capability, process automation, and control possibilities, is now an integral part of food science and engineering. New technology and ease of use expands the range of techniques that scientists and researchers have at the

Chemical Engineering Fluid Mechanics Ron Darby 2016-11-30 This book provides readers with the most current, accurate, and practical fluid mechanics related applications that the practicing BS level engineer needs today in the chemical and related industries, in addition to a fundamental understanding of these applications based upon sound fundamental basic scientific principles. The emphasis remains on problem solving, and the new edition includes many more examples.

Ullmann's Encyclopedia of Industrial Chemistry Fritz Ullmann 2003

化工原理 蒋维钧 2005 本书包括流体流动、流体输送机械、流体流过颗粒和颗粒层的流动及传热等4章和21个附录。

Problem Solving in Chemical and Biochemical Engineering with POLYMATH, Excel, and MATLAB Michael B. Cutlip 2008 This book discusses and illustrates practical problem solving in the major areas of chemical and biochemical engineering and related disciplines using the novel software capabilities of POLYMATH, Excel, and MATLAB. Students and engineering/scientific professionals will be able to develop and enhance their abilities to effectively and efficiently solve realistic problems from the simple to the complex. This new edition greatly expands the coverage to include chapters on biochemical engineering, separation processes and process control. Recent advances in the POLYMATH software package and new book chapters on Excel and MATLAB usage allow for exceptional efficiency and flexibility in achieving problem solutions. All of the problems are clearly organized and many complete and partial solutions are provided for all three packages. A special web site provides additional resources for readers and special reduced pricing for the latest educational version of POLYMATH.

Unit Operations of Chemical Engineering Warren L. McCabe 2014

Food Engineering Handbook Theodoros Varzakas 2014-12-02 Food Engineering Handbook: Food Engineering Fundamentals provides a stimulating and up-to-date review of food engineering phenomena. Combining theory with a practical, hands-on approach, this book covers the key aspects of food engineering, from mass and heat transfer to steam and boilers, heat exchangers, diffusion, and absorption. A complement to Food Engineering Handbook: Food Process Engineering, this text: Explains the interactions between different food constituents that might lead to changes in food properties Describes the characterization of the heating behavior of foods, their heat transfer, heat exchangers, and the equipment used in each food engineering method Discusses rheology, fluid flow, evaporation, and distillation and includes illustrative case studies of food behaviors Presenting cutting-edge information, Food Engineering Handbook: Food Engineering Fundamentals is an essential reference on the fundamental concepts associated with food engineering today.

Environmental Engineering Science William W. Nazaroff 2000-11-20 This book covers the fundamentals of environmental engineering and applications in water quality, air quality, and hazardous waste management. It begins by describing the fundamental principles that serve as the foundation of the entire field of environmental engineering. Readers are then systematically reintroduced to these fundamentals in a manner that is tailored to the needs of environmental engineers, and that is not too closely tied to any specific application.

Computer Methods in Chemical Engineering Nayef Ghasem 2011-08-25 While various software packages have become quite useful for performing unit operations and other kinds of processes in chemical engineering, the fundamental theory and methods of calculation must also be understood in order to effectively test the validity of these packages and verify the results. Computer Methods in Chemical Engineering presents the most commonly used simulation software, along with the theory involved. It covers chemical engineering thermodynamics, fluid mechanics, material and energy balances, mass transfer operations, reactor design, and computer applications in chemical engineering. Through this book, students learn: What chemical engineers do The functions and theoretical background of basic chemical engineering unit operations How to simulate chemical processes using software packages How to size chemical process units manually and with software How to fit experimental data How to solve linear and nonlinear algebraic equations as well as ordinary differential equations Along with exercises and references, each chapter contains a theoretical description of process units followed by numerous examples that are solved step by step via hand calculations and computer simulation using Hysys/Unisim, PRO/II, Aspen Plus, and SuperPro Designer. Adhering to the Accreditation Board for Engineering and Technology (ABET) criteria, the book gives students the tools needed to solve real problems involving thermodynamics and fluid-phase equilibria, fluid flow, material and energy balances, heat exchangers, reactor design, distillation, absorption, and liquid–liquid extraction.

Chemical Process Industries Randolph Norris Shreve 1967

Process Engineering and Design Using Visual Basic®, Second Edition Arun Datta 2013-09-20 Software tools are a great aid to process engineers, but too much dependence on such tools can often lead to inappropriate and suboptimal designs. Reliance on software is also a hindrance without a firm understanding of the principles underlying its operation, since users are still responsible for devising the design. In Process Engineering and Design Using Visual Basic, Arun K. Datta provides a unique and versatile suite of programs along with simultaneous development of the underlying concepts, principles, and mathematics. Each chapter details the theory and techniques that provide the basis for design and engineering software and then showcases the development and utility of programs developed using the material outlined in the chapter. This all-inclusive guide works systematically from basic mathematics to fluid mechanics, separators, overpressure protection, and glycol dehydration, providing basic design guidelines based on international codes. Worked examples demonstrate the utility of each program, while the author also explains problems and limitations associated with the simulations. After reading this book you will be able to immediately put these programs into action and have total confidence in the result, regardless of your level of experience. Companion Visual Basic and Excel files are available for download on under the "Downloads/Updates" tab on this web page.

Chemical Engineering Education 2002

Kirk-Othmer Encyclopedia of Chemical Technology Kirk-Othmer 2004 Contains the 5th ed. of the Kirk-Othmer encyclopedia of chemical technology. Includes risk management, enterprise resource planning, outsourcing, combinatorial synthesis and technology, functional foods, process automation, electronic chemicals, specialty silicones, mergers and acquisitions, nanoparticles, bioinformatics, ISO 14000, micron-scale chemical analysis, medical applications of biodegradable materials, product development, strategies, drug discovery strategies, chemistry of aging, single-site catalysis, custom manufacturing, and global chemical market analysis. strategies, drug discovery strategies, chemistry of aging, single-site catalysis, custom manufacturing, and global chemical market analy.

Problem Solving in Chemical Engineering with Numerical Methods Michael B. Cutlip 1999 "A companion book including interactive software for students and professional engineers who want to utilize problem-solving software to effectively and efficiently obtain solutions to realistic and complex problems. An Invaluable reference book that discusses and Illustrates practical numerical problem solving in the core subject areas of Chemical Engineering. Problem Solving in Chemical Engineering with Numerical Methods provides an extensive selection of problems that require numerical solutions from throughout the core subject areas of chemical engineering. Many are completely solved or partially solved using POLYMATH as the representative mathematical problem-solving software, Ten representative problems are also solved by Excel, Maple, Mathcad, MATLAB, and Mathematica. All problems are clearly organized and all necessary data are provided. Key equations are presented or derived. Practical aspects of efficient and effective numerical problem solving are emphasized. Many complete solutions are provided within the text and on the CD-ROM for use in problem-solving exercises."--BOOK JACKET.Title Summary field provided by Blackwell North America,

A Multi-stage Micro-tangential Flow Filtration System for BioMEMS Application Patrick Pak-Ho Leung 2002
Piping Design Handbook John J. McKetta Jr 1992-01-29 This encyclopedic volume covers almost every phase of piping design - presenting procedures in a straightforward way.;Written by 82 world experts in the field, the Piping Design Handbook: details the basic principles of piping design; explores pipeline shortcut methods in an in-depth manner; and presents expanded rules of thumb for the piping desig
Applied Numerical Methods for Food and Agricultural Engineers Prabir K. Chandra 2017-12-14 Written from the expertise of an agricultural engineering background, this exciting new book presents the most useful numerical methods and their complete program listings.
Introduction to Chemical Engineering Thermodynamics Joseph Mauk Smith 2001 Presents comprehensive coverage of the subject of thermodynamics from a chemical engineering viewpoint. This text provides an exposition of the principles of thermodynamics and details their application to chemical processes. It contains problems, examples, and illustrations to help students understand complex concepts.
Chemical Engineering 2005
Principles of Downstream Techniques in Biological and Chemical Processes Mukesh Doble 2016-01-05 Downstream processing is an essential practice in the production and purification of biosynthethic materials, which is especially important in the production of pharmaceutical products. This book covers the fundamentals and the design concepts of various downstream recovery and purification steps (unit operations) involved in biochemical and chemical processes. The book describes cell breakage and recovery of intracellular material, isolation of solids, product recovery, product enrichment, and product polishing and finishing. It also covers basic chemical engineering purification techniques such as distillation, absorption, adsorption, etc. Described in the book are several case studies that discuss the various unit operation in each of the processes. An important point to consider is the economics of the downstream operation, and this book provides practical information on capital costs and operating expenses in addition to other operating cost factors with respect to downstream processing. Green chemistry and safety issues are also addressed. Practicing chemical engineers in biotechnology and pharmaceutical chemistry and other areas will find this book valuable as a reference on downstream techniques used in biological processes. Students in chemical engineering would benefit from this book as well.
Rules of Thumb for Chemical Engineers Stephen M Hall 2012-07-27 Rules of Thumb for Chemical Engineers, Fifth Edition, provides solutions, common sense techniques, shortcuts, and calculations to help chemical and process engineers deal with practical on-the-job problems. It discusses physical properties for proprietary materials, pharmaceutical and biopharmaceutical sector heuristics, and process design, along with closed-loop heat transfer systems, heat exchangers, packed columns, and structured packings. Organized into 27 chapters, the book begins with an overview of formulae and data for sizing piping systems for incompressible and compressible flow. It then moves to a discussion of design recommendations for heat exchangers, practical equations for solving fractionation problems, along with design of reactive absorption processes. It also considers different types of pumps and presents narrative as well as tabular comparisons and application notes for various types of fans, blowers, and compressors. The book also walks the reader through the general rules of thumb for vessels, how cooling towers are sized based on parameters such as return temperature and supply temperature, and specifications of refrigeration systems. Other chapters focus on pneumatic conveying, blending and agitation, energy conservation, and process modeling. Chemical engineers faced with fluid flow problems will find this book extremely useful. Rules of Thumb for Chemical Engineers brings together solutions, information and work-arounds that engineers in the process industry need to get their job done. New material in the Fifth Edition includes physical properties for proprietary materials, six new chapters, including pharmaceutical, biopharmaceutical sector heuristics, process design with simulation software, and guidelines for hazardous materials and processes Now includes SI units throughout alongside
Current Drying Processes Israel Pala-Rosas 2020-07-01 The drying stage is important in biotechnological and chemical processes because it allows the pretreatment of feedstocks with different moisture contents for their physical or chemical transformation. Drying also enables the post-treatment of products for their final presentation and packaging, thus having wide application in the food, agro-industrial, pharmaceutical, and chemical industries. Current Drying Processes presents recent advances in the development of drying operations through the presentation of chapters dealing with theoretical and experimental aspects of different technologies, namely solar, convective, fluidized, and ultrasonic drying, for organic and inorganic materials.
Managing Matured Fields and Wells István Lakatos 2005 According to a widely accepted forecast, the world reserve of crude oil (known and to be explored) is about 360 Gt. The global oil demand in the 21st century, however, will be roughly 250-260 Gt, thus the recovery factor must be doubled (from 30-35% at present to 65-70% on average) to meet the predicted global demand. Unfortunately, more than 70% of the worldwide oil and gas production comes from depleted reservoirs. Consequently, revitalization of matured oil and gas fields have priority as part of the availability of hydrocarbons. Implementation of novel IOR/EOR technologies, and stimulation and optimization of well performance while minimizing the environmental impacts, will form the main stream of developments in the coming years and decades. Necessarily, the R+D activity will and must be strengthened in the future putting the oil and gas industry on a new pedestal. This book demonstrates the recent contributions of research projects to oilfield chemistry and advanced production te
McGraw-Hill Encyclopedia of Science & Technology McGraw-Hill 2002 Illustrations and text provide a compilation of the latest data on scientific and technological topics.
Fundamentals of Momentum, Heat, and Mass Transfer James R. Welty 1976
Food Engineering Handbook, Two Volume Set Theodoros Varzakas 2014-12-12 Food Engineering Handbook, Two-Volume Set provides a stimulating and up-to-date review of food engineering phenomena. It also addresses the basic and applied principles of food engineering methods used in food processing operations around the world. Combining theory with a practical, hands-on approach, this set examines the thermophysical properties and modeling of selected processes such as chilling, freezing, and dehydration, and covers the key aspects of food engineering, from mass and heat transfer to steam and boilers, heat exchangers, diffusion, and absorption. Comprised of Food Engineering Handbook: Food Engineering Fundamentals and Food Engineering Handbook: Food Process Engineering, this comprehensive resource: Explains the interactions between different food constituents that might lead to changes in food properties Describes the characterization of the heating behavior of foods, their heat transfer, heat exchangers, and the equipment used in each food engineering method Discusses rheology, fluid flow, evaporation, distillation, size reduction, mixing, emulsion, and encapsulation Provides case studies of solid–liquid and supercritical fluid extraction and food behaviors Explores fermentation, enzymes, fluidized-bed drying, and more Presenting cutting-edge information on new and emerging food engineering processes, Food Engineering Handbook, Two-Volume Set offers a complete reference on the fundamental concepts, modeling, quality, safety, and technologies associated with food engineering and processing operations today.
Rules of Thumb for Chemical Engineers Stephen Hall 2017-11-22 Rules of Thumb for Chemical Engineers, Sixth Edition, is the most complete guide for chemical and process engineers who need reliable and authoritative solutions to on-the-job problems. The text is comprehensively revised and updated with new data and formulas. The book helps solve process design problems quickly, accurately and safely, with hundreds of common sense techniques, shortcuts and calculations. Its concise sections detail the steps needed to answer critical design questions and challenges. The book discusses physical properties for proprietary materials, pharmaceutical and biopharmaceutical sector heuristics, process design, closed-loop heat transfer systems, heat exchangers, packed columns and structured packings. This book will help you: save time you no longer have to spend on theory or derivations; improve accuracy by exploiting well tested and accepted methods culled from industry experts; and save money by reducing reliance on consultants. The book brings together solutions, information and work-arounds from engineers in the process industry. Includes new chapters on biotechnology and filtration Incorporates additional tables with typical values and new calculations Features supporting data for selecting and specifying heat transfer equipment
Chemical Engineering Design Project Martyn S Ray 2020-08-12 This new edition follows the original format, which combines a detailed case study - the production of phthalic anhydride - with practical advice and comprehensive background information. Guiding the reader through all major aspects of a chemical engineering design, the text includes both the initial technical and economic feasibility study as well as the detailed design stages. Each aspect of the design is illustrated with material from an award-winning student design project. The book embodies the "learning by doing" approach to design. The student is directed to appropriate information sources and is encouraged to make decisions at each stage of the design process rather than simply following a design method. Thoroughly revised, updated, and expanded, the accompanying text includes developments in important areas and many new references.
Unit Operations of Chemical Engineering Warren Lee McCabe 2005 ******Recently Published!******Unit Operations of Chemical Engineering, 7th edition continues its lengthy, successful tradition of being one of McGraw-Hill's oldest texts in the Chemical Engineering Series. Since 1956, this text has been the most comprehensive of the introductory, undergraduate, chemical engineering titles available. Separate chapters are devoted to each of the principle unit operations, grouped into four sections: fluid mechanics, heat transfer, mass transfer and equilibrium stages, and operations involving particulate solids. Now in its seventh edition, the text still contains its balanced treatment of theory and engineering practice, with many practical, illustrative examples included. Almost 30% of the problems have been revised or are new, some of which cover modern topics such as food processing and biotechnology. Other unique topics of this text include diafiltration, adsorption and membrane operations.