

Examples Of Chemical Engineering

Most problems encountered in chemical engineering are sophisticated and interdisciplinary. Thus, it is important for today's engineering students, researchers, and professionals to be proficient in the use of software tools for problem solving. MATLAB® is one such tool that is distinguished by the ability to perform calculations in vector-matrix form, a large library of built-in functions, strong structural language, and a rich set of graphical visualization tools. Furthermore, MATLAB integrates computations, visualization and programming in an intuitive, user-friendly environment. Chemical Engineering Computation with MATLAB® presents basic to advanced levels of problem-solving techniques using MATLAB as the computation environment. The book provides examples and problems extracted from core chemical engineering subject areas and presents a basic instruction in the use of MATLAB for problem solving. It provides many examples and exercises and extensive problem-solving instruction and solutions for various problems. Solutions are developed using fundamental principles to construct mathematical models and an equation-oriented approach is used to generate numerical results. A wealth of examples demonstrate the implementation of various problem-solving approaches and methodologies for problem formulation, problem solving, analysis, and presentation, as well as visualization and documentation of results. This book also provides aid with advanced problems that are often encountered in graduate research and industrial operations, such as nonlinear regression, parameter estimation in differential systems, two-point boundary value problems and partial differential equations and optimization.

Chemical Engineering and Chemical Process Technology is a theme component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. Chemical engineering is a branch of engineering, dealing with processes in which materials undergo changes in their physical or chemical state. These changes may concern size, energy content, composition and/or other application properties. Chemical engineering deals with many processes belonging to chemical industry or related industries (petrochemical, metallurgical, food, pharmaceutical, fine chemicals, coatings and colors, renewable raw materials, biotechnological, etc.), and finds application in manufacturing of such products as acids, alkalis, salts, fuels, fertilizers, crop protection agents, ceramics, glass, paper, colors, dyestuffs, plastics, cosmetics, vitamins and many others. It also plays significant role in environmental protection, biotechnology, nanotechnology, energy production and sustainable economical development. The Theme on Chemical Engineering and Chemical Process Technology deals, in five volumes and covers several topics such as: Fundamentals of Chemical Engineering; Unit Operations – Fluids; Unit Operations – Solids; Chemical Reaction Engineering; Process Development, Modeling, Optimization and Control; Process Management; The Future of Chemical Engineering; Chemical Engineering Education; Main Products, which are then expanded into multiple subtopics, each as a chapter. These five volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

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Focusing on the application of mathematics to chemical engineering, Applied Mathematical Methods for Chemical Engineers, Second Edition addresses the setup and verification of mathematical models using experimental or other independently derived data. An expanded and updated version of its well-respected predecessor, this book uses worked examples to illustrate several mathematical methods that are essential in successfully solving process engineering problems. The book first provides an introduction to differential equations that are common to chemical engineering, followed by examples of first-order and linear second-order ordinary differential equations (ODEs). Later chapters examine Sturm–Liouville problems, Fourier series, integrals, linear partial differential equations (PDEs), and regular perturbation. The author also focuses on examples of PDE applications as they relate to the various conservation laws practiced in chemical engineering. The book concludes with discussions of dimensional analysis and the scaling of boundary value problems and presents selected numerical methods and available software packages. New to the Second Edition · Two popular approaches to model development: shell balance and conservation law balance · One-dimensional rod model and a planar model of heat conduction in one direction · Systems of first-order ODEs · Numerical method of lines, using MATLAB® and Mathematica where appropriate This invaluable resource provides a crucial introduction to mathematical methods for engineering and helps in choosing a suitable software package for computer-based algebraic applications. Contemporary Chemical Process Engineers face complex design and research problems. Temperature-dependent physical properties and non-Newtonian flow behavior of substances in a process cannot be predicted by numerical mathematics. Scaling-up equipment for processing can often only be done with partial similarity methods. Standard textbooks often neglect topics like dimensional analysis, theory of similarity and scale-up. This book fills this gap! It is aimed both at university students and the process engineer. It presents dimensional analysis very comprehensively with illustrative examples of mechanical, thermal and chemical processes.

Chemical engineering students and chemical engineers are being asked to solve problems that are complex, whether the applications are in refineries, chemical or pharmaceutical plants. The aim of this book is to demonstrate the problems in chemical engineering which have to solve by Finite Difference Methods. This book is a thorough presentation of Finite Difference Methods used in Chemical Engineering. The goal of this book is to help you practice better chemical engineering. It also contains case studies with worked out examples to demonstrate the Finite Difference Method. This book is for the Chemical Engineer lays down a foundation for numerical problem solving and sets up a basis for more in-depth theory and applications. This text addresses the needs of senior undergraduates in chemical engineering, and students in applied chemistry and biochemical process engineering/food process engineering also.

Excerpt from A Handbook of Chemical Engineering, Vol. 2: Illustrated With Working Examples and Numerous Drawings From Actual Installations We may now leave the subject of natural gas, remembering always that should it at some future time be found in Great Britain in quantity, its use should by no means be neglected it is quite as easy to burn as producer gas or coal gas, and its heating power is very much greater than either of them. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at www.forgottenbooks.com This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works.

An up-to-date introduction to applied thermodynamics, this book will help readers master the fundamentals of applied thermodynamics as practiced today: with a molecular perspective and extensive use of process simulation. The book presents extensive practical examples throughout and makes extensive use of models and equations that may be worked with low-cost calculators and spreadsheet software.

The field of chemical engineering is in constant evolution, and access to information technology is changing the way chemical engineering problems are addressed. Inspired by the need for a user-friendly chemical engineering text that demonstrates the real-world applicability of

different computer programs, Introduction to Software for Chemical Engineers acquaints readers with the capabilities of various general purpose, mathematical, process modeling and simulation, optimization, and specialized software packages, while explaining how to use the software to solve typical problems in fluid mechanics, heat and mass transfer, mass and energy balances, unit operations, reactor engineering, and process and equipment design and control. Employing nitric acid production, methanol and ammonia recycle loops, and SO₂ oxidation reactor case studies and other practical examples, Introduction to Software for Chemical Engineers shows how computer packages such as Excel, MATLAB®, Mathcad, CHEMCAD, Aspen HYSYS®, gPROMS, CFD, DEM, GAMS, and AIMMS are used in the design and operation of chemical reactors, distillation columns, cooling towers, and more. Make Introduction to Software for Chemical Engineers your go-to guide and quick reference for the use of computer software in chemical engineering applications.

The book describes the basic principles of transforming nano-technology into nano-engineering with a particular focus on chemical engineering fundamentals. This book provides vital information about differences between descriptive technology and quantitative engineering for students as well as working professionals in various fields of nanotechnology. Besides chemical engineering principles, the fundamentals of nanotechnology are also covered along with detailed explanation of several specific nanoscale processes from chemical engineering point of view. This information is presented in form of practical examples and case studies that help the engineers and researchers to integrate the processes which can meet the commercial production. It is worth mentioning here that, the main challenge in nanostructure and nanodevices production is nowadays related to the economic point of view. The uniqueness of this book is a balance between important insights into the synthetic methods of nano-structures and nanomaterials and their applications with chemical engineering rules that educates the readers about nanoscale process design, simulation, modelling and optimization. Briefly, the book takes the readers through a journey from fundamentals to frontiers of engineering of nanoscale processes and informs them about industrial perspective research challenges, opportunities and synergism in chemical Engineering and nanotechnology. Utilising this information the readers can make informed decisions on their career and business.

Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. A hands-on guide to advanced thermodynamics from a chemical engineering perspective This practical textbook provides advanced chemical engineering students with the must-have knowledge needed to apply the principles of thermodynamics to a variety of systems and problems. Written by a seasoned chemical engineering academic, the book is presented in an integrated manner and features real-world examples and problems taken from contemporary engineering. Advanced Thermodynamics for Chemical Engineers begins with discussions on the applications of classical thermodynamic principles to equations of state, non-ideal solutions, and complex physical and chemical equilibria. From there, you will get discussions on more progressive topics, including statistical thermodynamics and irreversible or non-equilibrium thermodynamics, and group-contribution methods. The book concludes with a chapter on the use of computational chemistry to calculate thermodynamic parameters. Contains examples of applications in different disciplines, including biology, material science, and physics Fills a gap in the market by addressing topics that are somewhat lacking or seldom found elsewhere Written by a chemical engineering educator and experienced author

"Introduction to Chemical Engineering Thermodynamics, 6/e," presents comprehensive coverage of the subject of thermodynamics from a chemical engineering viewpoint. The text provides a thorough exposition of the principles of thermodynamics and details their application to chemical processes. The chapters are written in a clear, logically organized manner, and contain an abundance of realistic problems, examples, and illustrations to help students understand complex concepts. New ideas, terms, and symbols constantly challenge the readers to think and encourage them to apply this fundamental body of knowledge to the solution of practical problems. The comprehensive nature of this book makes it a useful reference both in graduate courses and for professional practice. The sixth edition continues to be an excellent tool for teaching the subject of chemical engineering thermodynamics to undergraduate students.

Students will be led step-by-step through a chemical engineering project that illustrates important aspects of the discipline and how they are connected. At each step, they will be presented with a new aspect of chemical engineering and have the opportunity to use what they have learned to solve engineering problems and make engineering decisions. The overview of chemical engineering presented in Introduction to Chemical Engineering: Tools for Today and Tomorrow, 1st Edition helps students to form a conceptual "skeleton" of the discipline. It has an increased focus on contemporary applications of chemical engineering. Brief statements about the leadership role of chemical engineering have been added regarding the many challenges that come with it. Discussions have been added to the end of most chapters providing examples of how topics in the chapter are applied to current problems of society to help motivate student study of the topics.

This new edition contains chapters on process synthesis, computer-aided design and design of chemical reactors. The economic analysis has been updated. Numerous real examples include computer or hand solutions, with an increased emphasis on computer use in design, economic evaluation and optimization.

Written by a chemical engineer rather than by a computer scientist, this book fills the gap between texts which teach computer languages or programming methods and chemical engineering texts which omit details of writing programs. In order to write a computer program and get it to work, general theoretical principles are not enough; one has to actually do the job. This is done in each case by first taking the reader through a manual calculation, then presenting a computer program to perform the same task. Explanation of how the program operates is given in some detail. Topics discussed in this way include: computer flowsheeting; interpretation and accessing of results and physical data; forward feed multi-effect evaporation; binary distillation; linear programming; introduction to finite differences with simple heat exchanger example; steady state multi-dimensional heat conduction; unsteady state heat conduction; solution of automatic control problems using finite differences. In each case, the necessary theory is fully introduced. The programs are written in BASIC - an easily learnt, moderately powerful language available on both mainframe and desk-top computers.

'Modelling with Differential Equations in Chemical Engineering' covers the modelling of rate processes of engineering in terms of differential equations. While it includes the purely mathematical aspects of the solution of differential equations, the main emphasis is on the derivation and solution of major equations of engineering and applied science. Methods of solving differential equations by analytical and numerical means are presented in detail with many solved examples, and problems for solution by the reader. Emphasis is placed on numerical and computer methods of solution. A key chapter in the book is devoted to the principles of mathematical modelling. These principles are applied to the equations in important engineering areas. The major disciplines covered are thermodynamics, diffusion and mass transfer, heat transfer, fluid dynamics, chemical reactions, and automatic control. These topics are of particular value to chemical engineers, but also are of interest to mechanical, civil, and environmental engineers, as well as applied scientists. The material is also suitable for undergraduate and beginning graduate students, as well as for review by practising engineers.

Suitable for undergraduates, postgraduates and professionals, this is a comprehensive text on physical and chemical equilibrium. De Nevers is also the author of Fluid Mechanics for Chemical Engineers.

With a focus on actual industrial processes, e.g. the production of light alkenes, synthesis gas, fine chemicals, polyethylene, it

encourages the reader to think “out of the box” and invent and develop novel unit operations and processes. Reflecting today’s emphasis on sustainability, this edition contains new coverage of biomass as an alternative to fossil fuels, and process intensification. The second edition includes: New chapters on Process Intensification and Processes for the Conversion of Biomass Updated and expanded chapters throughout with 35% new material overall Text boxes containing case studies and examples from various different industries, e.g. synthesis loop designs, Sasol I Plant, Kaminsky catalysts, production of Ibuprofen, click chemistry, ammonia synthesis, fluid catalytic cracking Questions throughout to stimulate debate and keep students awake! Richly illustrated chapters with improved figures and flow diagrams Chemical Process Technology, Second Edition is a comprehensive introduction, linking the fundamental theory and concepts to the applied nature of the subject. It will be invaluable to students of chemical engineering, biotechnology and industrial chemistry, as well as practising chemical engineers. From reviews of the first edition: “The authors have blended process technology, chemistry and thermodynamics in an elegant manner... Overall this is a welcome addition to books on chemical technology.” – The Chemist “Impressively wide-ranging and comprehensive... an excellent textbook for students, with a combination of fundamental knowledge and technology.” – Chemistry in Britain (now Chemistry World)

This is a review book for people planning to take the PE exam in Chemical Engineering. Prepared specifically for the exam used in all 50 states. It features 188 new PE problems with detailed step by step solutions. The book covers all topics on the exam, and includes easy to use tables, charts, and formulas. It is an ideal desk companion to DAS's Chemical Engineer License Review. It includes sixteen chapters and a short PE sample exam as well as complete references and an index. Chapters include the following topical areas: * Material and energy balances * Fluid dynamics * Heat transfer * Evaporation * Distillation * Absorption * Leaching * Liq-liq extraction * Psychrometry and humidification * Drying * Filtration * Thermodynamics * Chemical kinetics * Process control * Mass transfer * Plant safety The ideal study guide, this book brings all elements of professional problem solving together in one BIG BOOK. It is also an ideal desk reference, and it answers hundreds of the most frequently asked questions. It is the first truly practical, no-nonsense problem and solution book for the difficult PE exam. Full step-by-step solutions are additionally included.

Neural networks have received a great deal of attention among scientists and engineers. In chemical engineering, neural computing has moved from pioneering projects toward mainstream industrial applications. This book introduces the fundamental principles of neural computing, and is the first to focus on its practical applications in bioprocessing and chemical engineering. Examples, problems, and 10 detailed case studies demonstrate how to develop, train, and apply neural networks. A disk containing input data files for all illustrative examples, case studies, and practice problems provides the opportunity for hands-on experience. An important goal of the book is to help the student or practitioner learn and implement neural networks quickly and inexpensively using commercially available, PC-based software tools. Detailed network specifications and training procedures are included for all neural network examples discussed in the book.

This textbook, Material Balance and Process Calculations, has been carefully written to teach you important topics in material balance and process calculations by explaining them with a mindset to fully equip you in the topics. Whether you want this book for general studies of these topics or you want this book to study for an exam, you will find it a very useful tool. This textbook is a mass balance teacher which is suitable for students in universities and students in colleges. It will also serve as a useful tool for direct entry students who are preparing for entrance examinations into colleges and universities. This book is not only for engineering students but also for chemistry students or any student who is offering a course in chemistry. The step by step explanations presented in the worked examples are easy to understand since care was taken to sufficiently explain salient points and process ideas. Efforts have been made to achieve a complete and simplified explanation of every example given in this textbook. Many worked examples have been included in each topic in order to fully cover every complexity the topic might contain. This book will boost your level of understanding of material balance and process calculations. Numerous exercises at the end of each chapter are intended to test students' understanding of the topic. Therefore students are thus presented with an effective means of self-assessment whereby they can determine their individual strengths and revision needs. The topics covered in this eBook include: In this book, the modelling of dynamic chemical engineering processes is presented in a highly understandable way using the unique combination of simplified fundamental theory and direct hands-on computer simulation. The mathematics is kept to a minimum, and yet the nearly 100 examples supplied on www.wiley-vch.de illustrate almost every aspect of chemical engineering science. Each example is described in detail, including the model equations. They are written in the modern user-friendly simulation language Berkeley Madonna, which can be run on both Windows PC and Power-Macintosh computers. Madonna solves models comprising many ordinary differential equations using very simple programming, including arrays. It is so powerful that the model parameters may be defined as "sliders", which allow the effect of their change on the model behavior to be seen almost immediately. Data may be included for curve fitting, and sensitivity or multiple runs may be performed. The results can be seen simultaneously on multiple-graph windows or by using overlays. The resultant learning effect of this is tremendous. The examples can be varied to fit any real situation, and the suggested exercises provide practical guidance. The extensive experience of the authors, both in university teaching and international courses, is reflected in this well-balanced presentation, which is suitable for the teacher, the student, the chemist or the engineer. This book provides a greater understanding of the formulation and use of mass and energy balances for chemical engineering, in a most stimulating manner. This book is a third edition, which also includes biological, environmental and food process examples.

Best-selling introductory chemical engineering book - now updated with far more coverage of biotech, nanotech, and green engineering • Thoroughly covers material balances, gases, liquids, and energy balances. • Contains new biotech and bioengineering problems throughout. • Adds new examples and homework on nanotechnology, environmental engineering, and green engineering. • All-new student projects chapter. • Self-assessment tests, discussion problems, homework, and glossaries in each chapter. Basic Principles and Calculations in Chemical Engineering, 8/e, provides a complete, practical, and student-friendly introduction to the principles and techniques of modern chemical, petroleum, and environmental engineering. The authors introduce efficient and consistent methods for solving problems, analyzing data, and conceptually understanding a wide variety of processes. This edition has been revised to reflect growing

interest in the life sciences, adding biotechnology and bioengineering problems and examples throughout. It also adds many new examples and homework assignments on nanotechnology, environmental, and green engineering, plus many updates to existing examples. A new chapter presents multiple student projects, and several chapters from the previous edition have been condensed for greater focus. This text's features include:

- Thorough introductory coverage, including unit conversions, basis selection, and process measurements.
- Short chapters supporting flexible, modular learning.
- Consistent, sound strategies for solving material and energy balance problems.
- Key concepts ranging from stoichiometry to enthalpy.
- Behavior of gases, liquids, and solids.
- Many tables, charts, and reference appendices.
- Self-assessment tests, thought/discussion problems, homework problems, and glossaries in each chapter.

A brand new book, FUNDAMENTALS OF CHEMICAL ENGINEERING THERMODYNAMICS makes the abstract subject of chemical engineering thermodynamics more accessible to undergraduate students. The subject is presented through a problem-solving inductive (from specific to general) learning approach, written in a conversational and approachable manner. Suitable for either a one-semester course or two-semester sequence in the subject, this book covers thermodynamics in a complete and mathematically rigorous manner, with an emphasis on solving practical engineering problems. The approach taken stresses problem-solving, and draws from best practice engineering teaching strategies. FUNDAMENTALS OF CHEMICAL ENGINEERING THERMODYNAMICS uses examples to frame the importance of the material. Each topic begins with a motivational example that is investigated in context to that topic. This framing of the material is helpful to all readers, particularly to global learners who require big picture insights, and hands-on learners who struggle with abstractions. Each worked example is fully annotated with sketches and comments on the thought process behind the solved problems. Common errors are presented and explained. Extensive margin notes add to the book accessibility as well as presenting opportunities for investigation. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Although most realistic process engineering models require numerical solution, it is important for chemical engineering students to have an understanding of the gross tendencies of the particular model they are using. This understanding most naturally arises from deriving analytical solutions of a modified version of the problem being considered. Analytical models also allow for easier process optimizations. Emphasizing these analytical methods, Applied Mathematical Methods for Chemical Engineers introduces several techniques essential to solving real problems. The author's presentation shows students how to translate a problem from prose to mathematical symbolism and allows them to inductively build on previous experience. Designed for senior undergraduates and first-year graduates, the text provides detailed examples that allow students to experience how to actually use the methods presented. It contains an entire chapter of fully worked examples involving traditional mass, heat, and momentum applications along with cutting edge technologies, such as membrane separation and chemical vapor deposition. Another chapter acquaints readers with selected numerical methods and available software packages. Favoring clear, practical exposition over strict mathematical rigor, Applied Mathematical Methods for Chemical Engineers removes the mathematics phobia that often exists among chemical engineering students. It allows them to learn by example the techniques they will need to solve problems in practice.

"The authors—a chemical engineer and a civil engineer—have complimented each other in delivering an introductory text on optimization for engineers of all disciplines. It covers a host of topics not normally addressed by other texts. Although introductory in nature, it is a book that will prove invaluable to me and my staff, and belongs on the shelves of practicing environmental and chemical engineers. The illustrative examples are outstanding and make this a unique and special book." —John D. McKenna, Ph.D., Principal, ETS, Inc., Roanoke, Virginia "The authors have adeptly argued that basic science courses—particularly those concerned with mathematics—should be taught to engineers by engineers. Also, books adopted for use in such courses should also be written by engineers. The readers of this book will acquire an understanding and appreciation of the numerous mathematical methods that are routinely employed by practicing engineers. Furthermore, this introductory text on optimization attempts to address a void that exists in college engineering curricula. I recommend this book without reservation; it is a library 'must' for engineers of all disciplines."

—Kenneth J. Skipka, RTP Environmental Associates, Inc., Westbury, NY, USA Introduction to Optimization for Chemical and Environmental Engineers presents the introductory fundamentals of several optimization methods with accompanying practical engineering applications. It examines mathematical optimization calculations common to both environmental and chemical engineering professionals, with a primary focus on perturbation techniques, search methods, graphical analysis, analytical methods, linear programming, and more. The book presents numerous illustrative examples laid out in such a way as to develop the reader's technical understanding of optimization, with progressively difficult examples located at the end of each chapter. This book serves as a training tool for students and industry professionals alike. FEATURES Examines optimization concepts and methods used by environmental and chemical engineering practitioners. Presents solutions to real-world scenarios/problems at the end of each chapter. Offers a pragmatic approach to the application of mathematical tools to assist the reader in grasping the role of optimization in engineering problem-solving situations. Provides numerous illustrative examples. Serves as a text for introductory courses, or as a training tool for industry professionals.

This book presents Maple solutions to a wide range of problems relevant to chemical engineers and others. Many of these solutions use Maple's symbolic capability to help bridge the gap between analytical and numerical solutions. The readers are strongly encouraged to refer to the references included in the book for a better understanding of the physics involved, and for the mathematical analysis. This book was written for a senior undergraduate or a first year graduate student course in chemical engineering. Most of the examples in this book were done in Maple 10. However, the codes should run in the most recent version of Maple. We strongly encourage the readers to use the classic worksheet (*.mws)

option in Maple as we believe it is more user-friendly and robust. In chapter one you will find an introduction to Maple which includes simple basics as a convenience for the reader such as plotting, solving linear and nonlinear equations, Laplace transformations, matrix operations, 'do loop,' and 'while loop.' Chapter two presents linear ordinary differential equations in section 1 to include homogeneous and nonhomogeneous ODEs, solving systems of ODEs using the matrix exponential and Laplace transform method. In section two of chapter two, nonlinear ordinary differential equations are presented and include simultaneous series reactions, solving nonlinear ODEs with Maple's 'dsolve' command, stop conditions, differential algebraic equations, and steady state solutions. Chapter three addresses boundary value problems.

This book's format follows an applications-oriented text and serves as a training tool for individuals in education and industry involved directly, or indirectly, with chemical reactors. It addresses both technical and calculational problems in this field. While this text can be complimented with texts on chemical kinetics and/or reactor design, it also stands alone as a self-teaching aid. The first part serves as an introduction to the subject title and contains chapters dealing with history, process variables, basic operations, kinetic principles, and conversion variables. The second part of the book addresses traditional reactor analysis; chapter topics include batch, CSTRs, tubular flow reactors, plus a comparison of these classes of reactors. Part 3 keys on reactor applications that include non-ideal reactors: thermal effects, interpretation of kinetic data, and reactor design. The book concludes with other reactor topics; chapter titles include catalysis, catalytic reactors, other reactions and reactors, and ABET-related topics. An extensive Appendix is also included.

In this book, optimization of chemical processes is performed using both classical and advanced algorithms.

This book treats modeling and simulation in a simple way, that builds on the existing knowledge and intuition of students. They will learn how to build a model and solve it using Excel. Most chemical engineering students feel a shiver down the spine when they see a set of complex mathematical equations generated from the modeling of a chemical engineering system. This is because they usually do not understand how to achieve this mathematical model, or they do not know how to solve the equations system without spending a lot of time and effort. Trying to understand how to generate a set of mathematical equations to represent a physical system (to model) and solve these equations (to simulate) is not a simple task. A model, most of the time, takes into account all phenomena studied during a Chemical Engineering course. In the same way, there is a multitude of numerical methods that can be used to solve the same set of equations generated from the modeling, and many different computational languages can be adopted to implement the numerical methods. As a consequence of this comprehensiveness and combinatorial explosion of possibilities, most books that deal with this subject are very extensive and embracing, making need for a lot of time and effort to go through this subject. It is expected that with this book the chemical engineering student and the future chemical engineer feel motivated to solve different practical problems involving chemical processes, knowing they can do that in an easy and fast way, with no need of expensive software.

Computer Programming Examples for Chemical Engineers Elsevier Science Limited

Unlike extensive major reference works or handbooks, Chemical Engineering: Trends and Developments provides readers with a ready-reference to latest techniques in selected areas of chemical engineering where research is and will be focused in the future. These areas are: bioseparations; particle science and design; nanotechnology; and reaction engineering. The aim of the book is to provide academic and R&D researchers with an overview of the main areas of technical development and how these techniques can be applied. Each chapter focuses on a technique, plus a selection of applications or examples of where the technique could be applied.

This book illustrates, by means of calculations and worked examples, all the important topics in the chemical engineering aspects of chemical reactor design.

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.

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