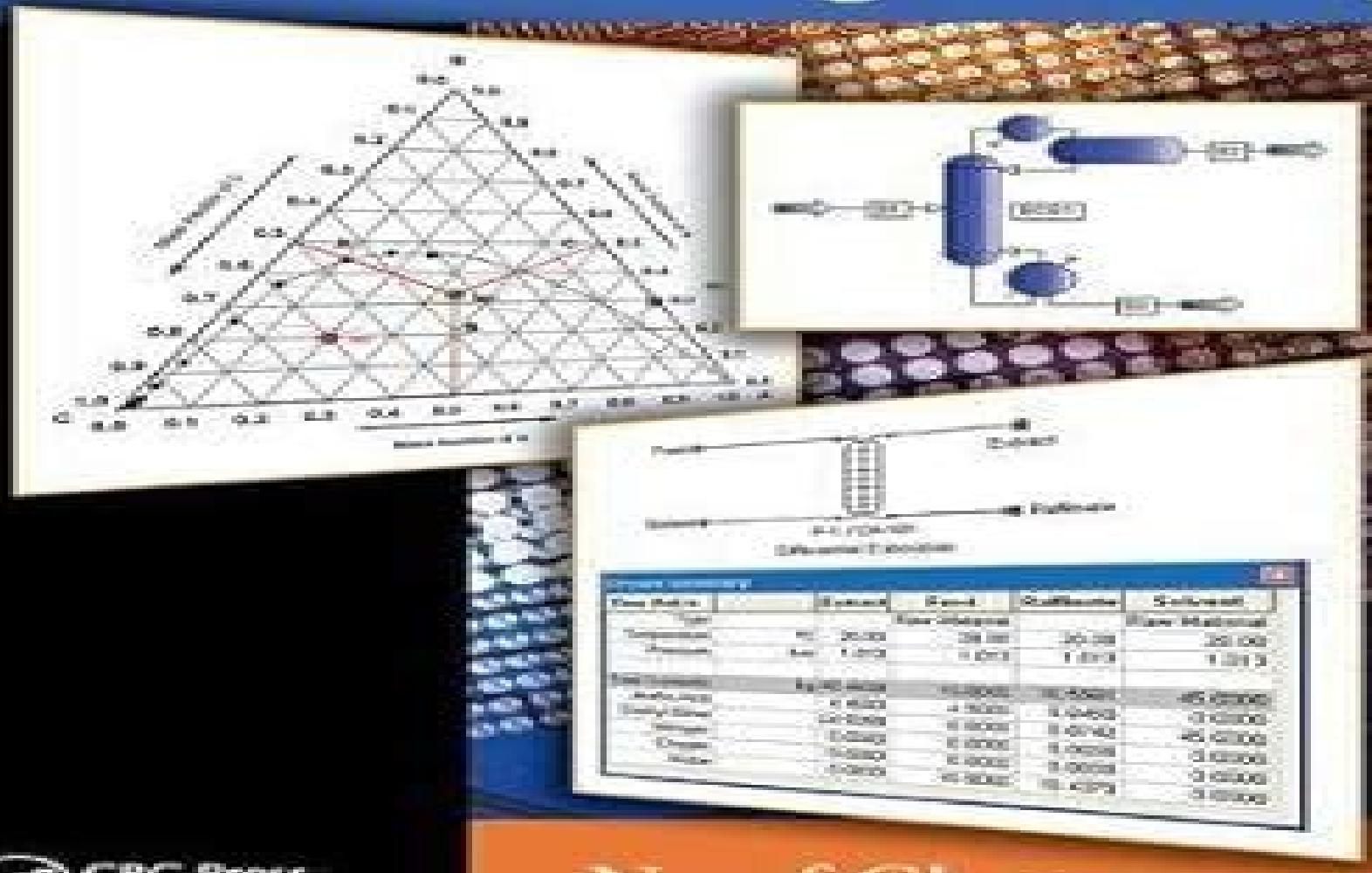
Computer Methods in Chemical Engineering



Nayef Ghasem

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C. Storey,H. H. Rosenbrock

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Computer Methods in Chemical Engineering Nayef Ghasem,2021-11-23 While various software packages have become essential for performing unit operations and other kinds of processes in chemical engineering the fundamental theory and methods of calculation must also be understood to effectively test the validity of these packages and verify the results Computer Methods in Chemical Engineering Second Edition presents the most 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 The highly anticipated Second Edition is thoroughly updated to reflect the latest updates in the featured software and has added a focus on real reactors introduces AVEVA Process Simulation software and includes new and updated appendixes Through this book students will learn the following 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 calculation 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 chemical engineering students and professionals the tools to solve real problems involving thermodynamics and fluid phase equilibria fluid flow material and energy balances heat exchangers reactor design distillation absorption and liquid extraction This new edition includes many examples simulated by recent software packages In addition fluid package information is introduced in correlation to the numerical problems in book An updated solutions manual and PowerPoint slides are also provided in addition to new video guides and UniSim program files Numerical Methods in Chemical Engineering Using Python(r) and Simulink(r) Nayef Ghasem,2025-09-29 Numerical methods are vital to the practice of chemical engineering allowing for the solution of real world problems Written in a concise and practical format this textbook introduces readers to the numerical methods required in the discipline of chemical engineering and enables them to validate their solutions using both Python and Simulink Introduces numerical methods followed by the solution of linear and nonlinear algebraic equations Deals with the numerical integration of a definite function and solves initial and boundary value ordinary differential equations with different orders Weaves in examples of various numerical methods and validates solutions to each with Python and Simulink graphical programming Features appendices on how to use Python and Simulink Aimed at advanced undergraduate and graduate chemical engineering students as well as practicing chemical engineers this textbook offers a guide to the use of two of the most widely used programs in the discipline The textbook features numerous video lectures of applications and a solutions manual for qualifying instructors

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interdisciplinary field of chemical engineering The text features a solutions manual lecture slides and MATLAB program files

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Modern Computer Techniques and their Impact on Chemical Engineering D. Behrens,1988 Efficient Computer Methods for the Practising Chemical Engineer ,1967 **On-line Computer Methods Relevant to Chemical Engineering** British Computer Society,Institution of Chemical Engineers,Institution of Chemical Engineers (Great Britain). Nottingham Group,1971 **Efficient Computer Methods for the Practising Chemical Engineer** ,1967 **Computer Programming Examples for Chemical Engineers** George Ross,1987 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 *Calculations and computer methods for chemical processes* Leroy F. Stutzman,1977 Efficient Computer Methods for the Practising Chemical Engineers Institution of Chemical Engineers (Great Britain). Midlands Branch,1967 **Computer Techniques in Chemical Engineering** American Institute of Chemical Engineers,1959 **Computational Methods in Chemical Engineering with Maple** Ralph E. White,Venkat R. Subramanian,2010-02-06 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

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