

AN INTRODUCTION
TO NUMERICAL METHODS
FOR CHEMICAL ENGINEERS

SECOND EDITION

James B. Riggs

An Introduction To Numerical Methods For Chemical Engineers 2nd Ed

James B. Riggs



An Introduction To Numerical Methods For Chemical Engineers 2nd Ed:

INTRODUCTION TO NUMERICAL METHODS IN CHEMICAL ENGINEERING, SECOND EDITION AHUJA, PRADEEP, 2019-08-01 This book is an exhaustive presentation of the applications of numerical methods in chemical engineering. Intended primarily as a textbook for B E B Tech and M Tech students of chemical engineering, the book will also be useful for research and development process professionals in the fields of chemical, biochemical, mechanical, and biomedical engineering. The book, now in its second edition, comprises three parts. Part I on General Chemical Engineering is the same as given in the first edition of the book. It explains solving linear and non-linear algebraic equations, chemical engineering thermodynamics problems, initial value problems, boundary value problems, and topics related to chemical reaction, dispersion, and diffusion, as well as steady and transient heat conduction. Whereas Part II and Part III, comprising two chapters and six chapters respectively, are newly introduced in the present edition. Besides three appendices covering computer programs, have been included. For practice, the book provides students with numerous worked-out examples and chapter-end exercises, including their answers. **NEW TO THE SECOND EDITION** Part II on Fixed Bed Catalytic Reactor consists of solving multiple gas phase reactions in a PFR, diffusion and multiple reactions in a catalytic pellet, and fixed bed catalytic reactor with multiple reactions. Part III on Multicomponent Distillation consists of solving vapour-liquid-liquid isothermal flash using NRTL model, adiabatic flash using Wilson model, bubble point method, theta method, and Naphtali Sandholm method for distillation using modified Raoult's law with Wilson activity coefficient model. **An Introduction to Numerical Methods for Chemical Engineers (2nd Ed.)** James B. Riggs, 1994-01-15 *An Introduction to Numerical Methods for Chemical Engineers* James B. Riggs, 1988 In this second edition, the author has added new problems and updated the accompanying FORTRAN computer programs. New library programs are included that perform singular value decomposition of a matrix and apply a conjugate gradient optimizer. Discussions have been added on the effect of stiffness on initial value problems and order-variable step size integration. An IBM-compatible disk is included, and an Apple and Macintosh disk, as well as a solutions manual, are available on request. Annotation copyright by Book News Inc, Portland, OR.

A Numerical Primer for the Chemical Engineer, Second Edition Edwin Zondervan, 2019-08-16 Designed as an introduction to numerical methods for students, this book combines mathematical correctness with numerical performance and concentrates on numerical methods and problem solving. It applies actual numerical solution strategies to formulated process models to help identify and solve chemical engineering problems. Second edition comes with an additional chapter on numerical integration and a section on boundary value problems in the relevant chapter. Additional material on general modelling principles, mass energy balances, and a separate section on DAEs is also included. Case study section has been extended with additional examples. *Numerical Methods for Chemical Engineers Using Excel, VBA, and MATLAB* Victor J. Law, 2013-03-05 While teaching the Numerical Methods for Engineers course over the last 15 years, the author found a need

for a new textbook one that was less elementary provided applications and problems better suited for chemical engineers and contained instruction in Visual Basic for Applications VBA This led to six years of developing teaching notes that have been enhanced to create the current textbook Numerical Methods for Chemical Engineers Using Excel VBA and MATLAB Focusing on Excel gives the advantage of it being generally available since it is present on every computer PC and Mac that has Microsoft Office installed The VBA programming environment comes with Excel and greatly enhances the capabilities of Excel spreadsheets While there is no perfect programming system teaching this combination offers knowledge in a widely available program that is commonly used Excel as well as a popular academic software package MATLAB Chapters cover nonlinear equations Visual Basic linear algebra ordinary differential equations regression analysis partial differential equations and mathematical programming methods Each chapter contains examples that show in detail how a particular numerical method or programming methodology can be implemented in Excel and or VBA or MATLAB in chapter 10 Most of the examples and problems presented in the text are related to chemical and biomolecular engineering and cover a broad range of application areas including thermodynamics fluid flow heat transfer mass transfer reaction kinetics reactor design process design and process control The chapters feature Did You Know boxes used to remind readers of Excel features They also contain end of chapter exercises with solutions provided

An Introduction to Numerical Methods for Chemical Engineers James B. Riggs, 1994 In this second edition of An Introduction to Numerical Methods for Chemical Engineers the author has revised text added new problems and updated the accompanying computer programs The result is a text that puts students on the cutting edge of solving relevant chemical engineering problems Designed explicitly for undergraduates this book provides students with software and experience to solve a number of problems Included in the text are Numerical algorithms in explicit detail Example problems from thermodynamic fluid flow heat transfer mass transfer kinetics and process design Equations developed specifically for the student from the example problems An introduction to advanced numerical techniques such as finite elements singular value decomposition and arc length homotopy An introduction to optimization A systematic approach to process modeling presented with advanced modeling examples The software that accompanies the book is for IBM compatible PCs A solution manual is also available upon request An Introduction to Numerical Methods for Chemical Engineers was first published in 1988 and has been taught in universities throughout the nation

A Numerical Primer for the Chemical Engineer Edwin Zondervan, 2014-08-12 Solve Developed Models in a Numerical Fashion Designed as an introduction to numerical methods for students A Numerical Primer for the Chemical Engineer explores the role of models in chemical engineering Combining mathematical correctness model verification with numerical performance model validation this text concentrates on numerical metho

Numerical Methods for Scientists and Engineers Zakeriya Altaç, 2024-10-15 Numerical Methods for Scientists and Engineers With Pseudocodes is designed as a primary textbook for a one semester course on Numerical Methods for sophomore or junior level students It covers the

fundamental numerical methods required for scientists and engineers as well as some advanced topics which are left to the discretion of instructors. The objective of the text is to provide readers with a strong theoretical background on numerical methods encountered in science and engineering and to explain how to apply these methods to practical real world problems. Readers will also learn how to convert numerical algorithms into running computer codes. Features: Numerous pedagogic features including exercises, pros and cons boxes for each method discussed and rigorous highlighting of key topics and ideas. Suitable as a primary text for undergraduate courses in numerical methods but also as a reference to working engineers. A Pseudocode approach that makes the book accessible to those with different or no coding backgrounds which does not tie instructors to one particular language over another. A dedicated website featuring additional code examples, quizzes, exercises, discussions and more: <https://github.com/zaltac/NumMethodsWPpseudoCodes>. A complete Solution Manual and PowerPoint Presentations are available free of charge to instructors at www.routledge.com/9781032754741. Numerical Methods for Engineers Santosh K Gupta, 1995. This book is intended to be a text for either a first or a second course in numerical methods for students in all engineering disciplines. Difficult concepts which usually pose problems to students are explained in detail and illustrated with solved examples. Enough elementary material that could be covered in the first level course is included. For example: methods for solving linear and nonlinear algebraic equations, interpolation, differentiation, integration and simple techniques for integrating ODEs and PDEs, ordinary and partial differential equations, advanced techniques and concepts that could form part of a second level course. Includes: gears method for solving ODE IVPs, initial value problems, stiffness of ODE IVPs, multiplicity of solutions, convergence characteristics, the orthogonal collocation method for solving ODE BVPs, boundary value problems and finite element techniques. An extensive set of graded problems, often with hints, has been included. Some involve simple applications of the concepts and can be solved using a calculator while several are from real life situations and require writing computer programs or use of library subroutines. Practice on these is expected to build up the reader's confidence in developing large computer codes.

Applied Mathematical Methods for Chemical Engineers Norman W. Loney, 2016-03-09. This book uses worked examples to showcase several mathematical methods that are essential to solving real world process engineering problems. The third edition includes additional examples related to process control, Bessel functions and contemporary areas such as drug delivery. The author inserts more depth on specific applications such as nonhomogeneous cases of separation of variables, adds a section on special types of matrices such as upper and lower triangular matrices, incorporates examples related to biomedical engineering applications and expands the problem sets of numerous chapters.

Decoding **An Introduction To Numerical Methods For Chemical Engineers 2nd Ed**: Revealing the Captivating Potential of Verbal Expression

In a time characterized by interconnectedness and an insatiable thirst for knowledge, the captivating potential of verbal expression has emerged as a formidable force. Its power to evoke sentiments, stimulate introspection, and incite profound transformations is genuinely awe-inspiring. Within the pages of "**An Introduction To Numerical Methods For Chemical Engineers 2nd Ed**," a mesmerizing literary creation penned by way of a celebrated wordsmith, readers set about an enlightening odyssey, unraveling the intricate significance of language and its enduring affect our lives. In this appraisal, we shall explore the book is central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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