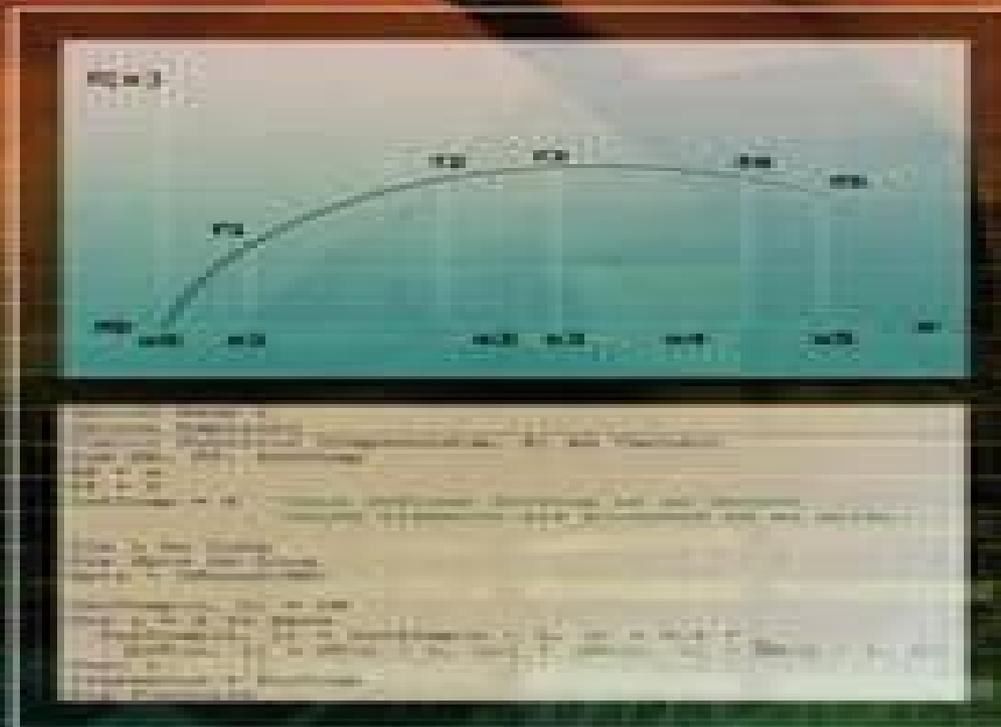


NUMERICAL METHODS for CHEMICAL ENGINEERS Using Excel, VBA, and MATLAB



VICTOR J. LAW



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Numerical Methods For Chemical Engineers Using Excel Vba And Matlab

**Kevin D. Dorfman, Prodrimos
Daoutidis**



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Brereton, 2018-05-29 A new full color completely updated edition of the key practical guide to chemometrics This new edition of this practical guide on chemometrics emphasizes the principles and applications behind the main ideas in the field using numerical and graphical examples which can then be applied to a wide variety of problems in chemistry biology chemical engineering and allied disciplines Presented in full color it features expansion of the principal component analysis classification multivariate evolutionary signal and statistical distributions sections and new case studies in metabolomics as well as extensive updates throughout Aimed at the large number of users of chemometrics it includes extensive worked problems and chapters explaining how to analyze datasets in addition to updated descriptions of how to apply Excel and Matlab for chemometrics Chemometrics Data Driven Extraction for Science Second Edition offers chapters covering experimental design signal processing pattern recognition calibration and evolutionary data The pattern recognition chapter from the first edition is divided into two separate ones Principal Component Analysis Cluster Analysis and Classification It also includes new descriptions of Alternating Least Squares ALS and Iterative Target Transformation Factor Analysis ITTFA Updated descriptions of wavelets and Bayesian methods are included Includes updated chapters of the classic chemometric methods e g experimental design signal processing etc Introduces metabolomics type examples alongside those from analytical chemistry Features problems at the end of each chapter to illustrate the broad applicability of the methods in different fields Supplemented with data sets and solutions to the problems on a dedicated website www.booksupport.wiley.com Chemometrics Data Driven Extraction for Science Second Edition is recommended for post graduate students of chemometrics as well as applied scientists e g chemists biochemists engineers statisticians working in all areas of data analysis

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[Applied Numerical Methods for Chemical Engineers](#) Navid Mostoufi, Alkis Constantinides, 2022-05-22 Applied Numerical Methods for Chemical Engineers emphasizes the derivation of a variety of numerical methods and their application to the solution of engineering problems with special attention to problems in the chemical engineering field These algorithms encompass linear and nonlinear algebraic equations eigenvalue problems finite difference methods interpolation differentiation and integration ordinary differential equations boundary value problems partial differential equations and linear and nonlinear regression analysis MATLAB is adopted as the calculation environment throughout the book because of its ability to perform all the calculations in matrix form its large library of built-in functions its strong structural language and its rich graphical visualization tools Through this book students and other users will learn about the basic features advantages and disadvantages of various numerical methods learn and practice many useful m-files developed for different numerical methods in addition to the MATLAB built-in solvers develop and set up mathematical models for problems commonly encountered in chemical engineering and solve chemical engineering related problems through examples and after chapter problems with MATLAB by creating application m-files Clearly and concisely develops a variety of numerical methods and applies them to the solution of chemical engineering problems These algorithms encompass linear and nonlinear algebraic equations eigenvalue problems finite difference methods interpolation linear and nonlinear regression analysis differentiation and integration ordinary differential equations boundary value problems and partial differential equations Includes systematic development of the calculus of finite differences and its application to the integration of differential equations and a detailed discussion of nonlinear regression analysis with powerful programs for implementing multivariable nonlinear regression and statistical analysis of the results Makes extensive use of MATLAB and Excel with most of the methods discussed implemented into general MATLAB functions All the MATLAB language scripts developed are listed in the text and included in the book's companion website Includes numerous real world examples and homework problems drawn from the field of chemical and biochemical engineering

Practical Numerical Methods for Chemical Engineers Richard A. Davis, 2013-09-25 A NEW 3rd third edition of this popular title is now available with updated and expanded coverage of Practical Numerical Methods Using Excel with VBA For more information visit www.d.umn.edu/~rdavis/PNM/PNMLExcelVBA3 Excel is the de facto computational tool used by practicing engineers and scientists Use this book to become proficient with VBA programming and boost your worksheets with time-saving enhancements and powerful numerical techniques Topics include an introduction to modeling Excel and VBA programming root finding for systems of linear and nonlinear equations derivative

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Numerical Methods with Chemical Engineering Applications Kevin D. Dorfman, Prodromos Daoutidis, 2017-01-11 Designed primarily for undergraduates but also graduates and practitioners this textbook integrates numerical methods and programming with applications from chemical engineering Combining mathematical rigor with an informal writing style it thoroughly introduces the theory underlying numerical methods its translation into MATLAB programs and its use for solving realistic problems Specific topics covered include accuracy convergence and numerical stability as well as stiffness and ill conditioning MATLAB codes are developed from scratch and their implementation is explained in detail all while assuming limited programming knowledge All scripts employed are downloadable and built in MATLAB functions are discussed and contextualised Numerous examples and homework problems from simple questions to extended case studies accompany the text allowing students to develop a deep appreciation for the range of real chemical engineering problems that can be solved using numerical methods This is the ideal resource for a single semester course on numerical methods as well as other chemical engineering courses taught over multiple semesters

Numerical Methods and Modeling for Chemical Engineers Mark E. Davis, 2013-01-01 Geared toward advanced undergraduates or graduate students of chemical engineering studying applied mathematics this text introduces the quantitative treatment of differential equations arising from modeling physical phenomena in chemical engineering Coverage includes topics such as ODE IVPs placing emphasis on numerical methods and modeling implemented in commercial mathematical software available in 1985

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

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 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 Numerical Methods for Chemical Engineering Kenneth J. Beers,2007 Suitable for a first year graduate course this textbook unites the applications of numerical mathematics and scientific computing to the practice of chemical engineering Written in a pedagogic style the book describes basic linear and nonlinear algebraic systems all the way through to stochastic methods Bayesian statistics and parameter estimation These subjects are developed at a level of mathematics suitable for graduate engineering study without the exhaustive level of the theoretical mathematical detail The implementation of numerical methods in MATLAB is integrated within each chapter and numerous examples in chemical engineering are provided with a library of corresponding MATLAB programs This book will provide the graduate student with essential tools required by industry and research alike Supplementary material includes solutions to homework problems set in the text MATLAB programs and tutorial lecture slides and complicated derivations for the more advanced reader These are available online at www.cambridge.org/9780521859714 Numerous applications specific to chemical engineering and MATLAB integrated into each chapter with an extensive library of example problems also located on the web It avoids theoretically detailed mathematics Contains numerous problems and homework exercises at the end of each chapter categorised according to difficulty with solutions available on the resource site **Applied Mathematics and Modeling for Chemical Engineers** Richard G. Rice,Duong D. Do,James E. Maneval,2023-03-07 Understand the fundamentals of applied mathematics with this up to date introduction Applied mathematics is the use of mathematical concepts and methods in various applied or practical areas including engineering computer science and more As engineering science expands the ability to work from mathematical principles to solve and understand equations has become an ever more critical component of engineering fields New engineering processes and materials place ever increasing mathematical demands on new generations of engineers who are looking more and more to applied mathematics for an expanded toolkit Applied Mathematics and Modeling for Chemical Engineers provides this toolkit in a comprehensive and easy to understand introduction Combining classical analysis of modern mathematics with more modern applications it offers everything required to assess and solve mathematical problems

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Applied Mathematical Methods for Chemical Engineers, Second Edition Norman W. Loney,2006-09-22 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

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