Steven C. Chapra • Raymond P. Canale

Numerical Methods for Engineers

With Programming and Software Applications

Third Edition

TATA McGRAW-HILL
EDITION

Numerical Methods For Engineers With Software And Programming Applications

Robert Joseph Schilling,Sandra L. Harris

Numerical Methods For Engineers With Software And Programming Applications:

Numerical Methods for Engineers Steven C. Chapra,Raymond P. 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Chemical Engineering Computation with MATLAB® Yeong Koo Yeo,2020-12-15 Chemical Engineering Computation with MATLAB Second Edition continues to present basic to advanced levels of problem solving techniques using MATLAB as the computation environment The Second Edition provides even more examples and problems extracted from core chemical engineering subject areas and all code is updated to MATLAB version 2020 It also includes a new chapter on computational intelligence and Offers exercises and extensive problem solving instruction and solutions for various problems Features solutions developed using fundamental principles to construct mathematical models and an equation oriented approach to generate numerical results Delivers a wealth of examples to 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 Includes an appendix offering an introduction to MATLAB for readers unfamiliar with the program which will allow them to write their own MATLAB programs and follow the examples in the book 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 This essential textbook readies engineering students researchers and professionals to be proficient in the use of MATLAB to solve sophisticated real world problems within the interdisciplinary field of chemical engineering The text features a solutions manual lecture slides and MATLAB program files _ **Excel for Scientists and Engineers** E Joseph Billo,2020-05-16 The Objective of This Book Numerical methods require extensive calculation which is easily accomplished using today s desktop computers A number of books have been written in which numerical methods are implemented using a specific programming language such as FORTRAN or C Most scientists and engineers received some training in computer programming in their college days but they or their computer may no longer have the capability to write or run programs in for example FORTRAN This book shows how to implement numerical methods using Microsoft Excel the most widely used spreadsheet software package Excel provides at least three ways for the scientist or engineer to apply numerical methods to problems by implementing the methods on a worksheet using worksheet formulas by using the built in tools that are provided within Excel by writing programs sometimes loosely referred to as macros in Excel s Visual Basic for Applications VBA programming language All of these approaches are illustrated in this book This is a book about numerical methods I have emphasized the methods and have kept the mathematical theory behind the methods to a minimum In many cases formulas are introduced with little or no description of the underlying theory I assume that the reader will be familiar with linear interpolation simple calculus regression etc Other topics such as cubic interpolation methods for solving differential equations and so on are covered in more detail and a few topics such as Bairstow s method for obtaining the roots of a regular polynomial are discussed in detail In this book I have provided a wide range of Excel solutions to problems In many cases I provide a series of examples that progress from a very simple implementation of the problem useful for understanding the logic and construction of the spreadsheet or VBA code to a more sophisticated one that is more general Some of the VBA macros are simple starting points and I encourage the reader to modify them others are or at least I intended them to be finished products that I hope users can employ on a regular basis Nearly 100% of the material in this book applies equally to the PC or Macintosh versions of Excel In a few cases I have pointed out the different keystrokes requires for the Macintosh version 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 *Numerical Methods for Engineers and Scientists* Robert D. Walker,1987-05-01

Numerical Methods for Engineering Applications Joel H. Ferziger,1998-04-17 The author also explores a wide range of methods for solving initial and boundary value problems *Numerical Analysis for Engineers* Bilal Ayyub,Richard H. McCuen,2015-09-18 Numerical Analysis for Engineers Methods and Applications demonstrates the power of numerical methods in the context of solving complex engineering and scientific problems The book helps to prepare future engineers and assists practicing engineers in understanding the fundamentals of numerical methods especially their applications limitations

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