

1. Record Nr.	UNINA9910523737003321
Autore	Gatzke E. P (Edward P.)
Titolo	Introduction to modeling and numerical methods for biomedical and chemical engineers / / Edward Gatzke
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	3-030-76449-4
Descrizione fisica	1 online resource (292 pages)
Disciplina	610.28
Soggetti	Biomedical engineering - Mathematical models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Preface -- Contents -- 1 Modern Engineering -- 1.1 Engineering -- 1.1.1 Chemical Engineering -- 1.1.2 Biomedical Engineering -- 1.1.3 Other Engineering Disciplines -- 1.2 General Problem Solving Strategies -- 1.2.1 Sketches and Schematics -- 1.2.2 Models and Numerical Solutions -- 1.3 Process Flow Charts -- 1.4 Computers in Engineering -- 1.5 Suggestions for Homework Submissions -- Problems -- Further Reading -- 2 Mathematical Fundamentals -- 2.1 Basic Math -- Problems: Basic Math -- 2.2 Basic Algebra -- Problems: Finding Solutions -- 2.3 Sets of Linear Equations -- Problems: Linear Equations -- 2.4 Unit Conversion -- Problems: Unit Conversion -- 2.5 Reading Graphs -- Problems: Graphs of Functions -- 2.6 Making Graphs -- Problems: Sketching Functions -- 2.7 Trigonometry -- Problems: Graphs of Functions -- 2.8 Calculus: Basic Derivatives -- Problems: Basic Derivatives -- 2.9 Calculus: Advanced Derivatives -- Problems: Advanced Derivatives -- Further Reading -- 3 Classification of Numerical Problems -- 3.1 General Classifications of Numerical Problems -- 3.1.1 Analytical vs. Numerical -- 3.1.2 Steady-State vs. Dynamic -- 3.1.3 Scalar vs. Multivariable Algebraic Equations -- 3.1.3.1 Multivariable Algebraic Equations -- 3.1.4 Linear vs. Nonlinear -- 3.1.5 Algebraic vs. Differential -- 3.1.6 Deterministic vs. Stochastic -- 3.2 Common Classes of Numerical Problems -- 3.2.1 Algebraic Equations -- 3.2.2 Numerical Optimization -- 3.2.3 Ordinary Differential Equations -- 3.2.4 Partial Differential Equations -- 3.2.5

Differential Algebraic Equations -- Problems -- 4 Engineering Modeling -- 4.1 Forces and Free Body Diagrams -- 4.1.1 Simple Force Balance Examples -- Example: Falling Droplet at Terminal Velocity -- Example: Buoyant Floating Solid -- 4.2 Electric Circuits -- 4.2.1 Kirchhoff's Current Law -- 4.2.2 Kirchhoff's Voltage Law. 4.3 Conservation of Mass -- 4.4 Mass Balance Examples -- Problems -- 5 Structured Programming -- 5.1 Introduction to Structured Programming -- 5.2 Variables -- 5.3 Assignment Statements -- 5.4 Input and Output -- 5.5 Data Types -- 5.6 IF Statements -- 5.7 FOR Statements -- 5.8 WHILE Statements -- 5.9 Scripts -- 5.10 Functions -- 5.11 Naming Conventions -- 5.12 Debugging -- 5.12.1 Pseudo Code -- 5.13 Compiling vs. Interpreting -- 5.14 Examples -- Problems -- Further Reading -- 6 Introduction to MATLAB -- 6.1 MATLAB Advantages and Disadvantages -- 6.2 Commands -- 6.2.1 Examples of Basic Matlab Commands -- 6.2.2 Examples of Basic Matlab Plotting Commands -- 6.3 Tutorials -- 6.3.1 MATLAB Basics -- 6.3.2 MATLAB Flow Control -- 6.3.3 MATLAB Linear Algebra and Root Finding -- 6.3.4 MATLAB Plotting -- 6.3.5 MATLAB Tutorials -- 7 Linear Algebra -- 7.1 Introduction -- 7.2 Solution by Row Reduction -- 7.3 Linear Equations: Special Cases -- 7.3.1 Case A: One Solution -- 7.3.2 Case B: No Solution -- 7.3.3 Case C: Many Solutions -- 7.3.4 Non-Square Systems -- 7.4 Vectors -- 7.4.1 Dot Product -- 7.5 The Matrix -- 7.5.1 Matrix Multiplication -- 7.5.2 Determinant of a Matrix -- 7.5.3 Cross Product -- 7.6 Matrix Representation of Sets of Linear Equations -- 7.6.1 Solving Sets of Linear Equations -- 7.6.2 Determining the Matrix Inverse -- 7.7 Visualization -- 7.7.1 Linear Transform -- 7.7.2 Range -- 7.8 Mass Balance Example -- 7.8.1 MATLAB Code Example -- Problems -- Further Reading -- 8 Root Finding and Integration -- 8.1 Finding Roots of an Equation -- 8.1.1 Real Gas -- 8.1.2 Falling Droplet -- 8.1.3 General Form -- 8.2 Newton's Method -- 8.3 Bisection Method -- 8.4 Multivariate Root Finding -- 8.5 Integrating a Function -- 8.5.1 Average Velocity -- 8.5.2 Average Concentration -- 8.5.3 Total Drug Delivered -- 8.5.4 Riemann Sums. 8.5.5 Function Integration vs. Euler Integration -- 8.6 Trapezoidal Integration -- Problems -- Further Reading -- 9 Introduction to Numerical Optimization -- 9.1 The Objective Function -- 9.2 Unconstrained Optimization -- 9.3 Constraints -- 9.3.1 Smallville Example -- 9.4 Optimality Conditions -- 9.4.1 Optimality of Smallville Example -- 9.4.2 Equality Constraints and Infeasibility -- 9.5 Convexity -- 9.6 Types of Optimization Problems -- Problems -- Further Reading -- 10 Introduction to Spreadsheets -- 10.1 Spreadsheet Advantages and Disadvantages -- 10.2 Excel Functions -- 10.3 Tutorials -- 10.3.1 Excel Tutorial 1 -- 10.3.2 Excel Tutorial 2 -- 10.3.3 Excel Tutorial 3 -- 10.3.4 Excel Tutorial 4 -- Problems -- Further Reading -- 11 Basic Probability and Statistics -- 11.1 Random Variables and Probability Distributions -- 11.2 Histograms -- 11.3 Specific Probability Distributions -- 11.3.1 Normal/Gaussian -- 11.3.2 Continuous Uniform -- 11.3.3 Lognormal -- 11.3.4 Weibull -- 11.3.5 Beta -- 11.3.6 Student's t -- 11.3.7 Discrete Uniform -- 11.3.8 Binomial -- 11.3.9 Poisson -- 11.4 Calculation of Basic Statistics -- 11.4.1 Mean -- 11.4.2 Median -- 11.4.3 Variance -- 11.4.4 Standard Deviation -- 11.4.5 Standard Error -- 11.5 Central Limit Theorem -- 11.6 Hypothesis Testing -- 11.6.1 Type I and Type II Errors -- 11.7 Applied Methods -- 11.8 Monte Carlo Methods -- Problems -- Further Reading -- 12 Linear Modeling -- 12.1 Linear Interpolation -- 12.2 Linear Extrapolation -- 12.3 Linear Regression -- 12.3.1 Correlation Coefficient -- 12.4 Transformation to Linear Form -- 12.5 Linearization -- Problems -- 13 Forces and Moments -- 13.1 Vectors

-- 13.1.1 Force Vector Components -- 13.1.2 Vector Addition -- 13.2 Moments -- 13.3 Static Equilibrium -- Problems -- 14 Differential Equations -- 14.1 Ordinary Differential Equations -- 14.1.1 Dynamic Mass Balance Example. 14.2 Euler Integration for ODEs -- 14.3 Boundary Value ODE Problems -- 14.4 Partial Differential Equations -- 14.4.1 Heat Transfer in Solids -- 14.4.2 Fluid Flow -- 14.4.3 Reaction and Diffusion of Dilute Species -- 14.4.4 Stress-Strain for Elastic Materials -- 14.5 Finite Difference Approximation for PDEs -- 14.5.1 PDE Boundary Conditions -- 14.6 Simple PDE Example -- 14.7 Introduction to COMSOL -- 14.8 Tutorials -- 14.9 COMSOL Design -- 14.9.1 Parametric Study -- Problems -- Further Reading -- Index.

2. Record Nr.	UNICAMPANIAVAN0071748
Autore	Wesselingh, J. A.
Titolo	Design and development of biological, chemical, food and pharmaceutical products / J. A. Wesselingh, Soren Kiil, Martin E. Vigild
Pubbl/distr/stampa	Chichester, : Wiley, c2007
ISBN	978-04-7006-154-1
Descrizione fisica	XII, 297 p. : ill. 24 cm
Altri autori (Persone)	Kiil, Soren Vigild, Martin E.
Disciplina	660.6
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia

3. Record Nr.	UNICAMPANIAVAN00029652
Autore	Alperin, Jonathan L.
Titolo	Groups and Representations / J. L. Alperin with Rowen B. Bell
Pubbl/distr/stampa	New York, : Springer, 1995
ISBN	978-03-87945-26-2
Descrizione fisica	x, 194 p. ; 25 cm
Altri autori (Persone)	Bell, Rowen B.
Soggetti	20-XX - Group theory and generalizations [MSC 2020] 20C15 - Ordinary representations and characters [MSC 2020] 20D10 - Solvable groups, theory of formations, Schunck classes, Fitting classes, -length, ranks [MSC 2020] 20D20 - Sylow subgroups, Sylow properties, -groups, -structure [MSC 2020] 20Dxx Abstract finite groups [MSC 2020]
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia