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Problem Solving in Chemical and Biochemical Engineering with POLYMATH, Excel, and MATLAB (2nd Edition)

Michael B. Cutlip, Mordechai Shacham

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Problem Solving in Chemical and Biochemical Engineering with POLYMATH™, Excel, and MATLAB®, Second Edition , is a valuable resource and companion that integrates the use of numerical problem solving in the three most widely used software packages: POLYMATH, Microsoft Excel, and MATLAB. Recently developed POLYMATH capabilities allow the automatic creation of Excel spreadsheets and the generation of MATLAB code for problem solutions. Students and professional engineers will appreciate the ease with which problems can be entered into POLYMATH and then solved independently in all three software packages, while taking full advantage of the unique capabilities within each package. The book includes more than 170 problems requiring numerical solutions.

This greatly expanded and revised second edition includes new chapters on getting started with and using Excel and MATLAB. It also places special emphasis on biochemical engineering with a major chapter on the subject and with the integration of biochemical problems throughout the book.

General Topics and Subject Areas, Organized by Chapter

- Introduction to Problem Solving with Mathematical Software Packages
- Basic Principles and Calculations
- Regression and Correlation of Data
- Introduction to Problem Solving with Excel
- Introduction to Problem Solving with MATLAB
- Advanced Problem-Solving Techniques
- Thermodynamics
- Fluid Mechanics
- Heat Transfer
- Mass Transfer
- Chemical Reaction Engineering
- Phase Equilibrium and Distillation
- Process Dynamics and Control
- Biochemical Engineering

Practical Aspects of Problem-Solving Capabilities

- Simultaneous Linear Equations
- Simultaneous Nonlinear Equations
- Linear, Multiple Linear, and Nonlinear Regressions with Statistical Analyses
- Partial Differential Equations (Using the Numerical Method of Lines)
- Curve Fitting by Polynomials with Statistical Analysis
- Simultaneous Ordinary Differential Equations (Including Problems Involving Stiff Systems, Differential-Algebraic Equations, and Parameter Estimation in Systems of Ordinary Differential Equations)

The Book's Web Site (http://www.problemsolvingbook.com)

- Provides solved and partially solved problem files for all three software packages, plus additional materials
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