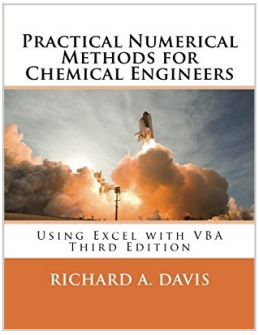

Practical Numerical Methods for Chemical Engineers: Using Excel with VBA, 3rd Edition

By Richard A Davis

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This latest edition expands *Practical Numerical Methods* with more *VBA* to boost *Excel's* power for modeling and analysis using the same numerical techniques found in more specialized math software. Visit the companion web site:

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to access all of the book's *Excel* and *VBA* files, and learn how to customize your own *Excel* workbooks with:

1. A refined macro-enabled *Excel* workbook with a suite of over 170 *VBA* user-defined functions, macros and user-forms for learning *VBA* and implementing advanced numerical techniques in *Excel*.
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4. Linear Equations: Matrix Algebra, Gaussian Elimination and Crout Reduction with Pivoting, Thomas, Cholesky, Power, Jacobi, and Interpolation Methods for Eigenvalues and Eigenvectors, Jacobi and Gauss-Seidel Iteration, Relaxation
5. Taylor Series Analysis: Finite Difference Derivative Approximation, Richardson's Extrapolation, Ridder's algorithm, Sensitivity
6. Nonlinear Equations Root Finding: Methods of Bisection, Regula Falsi, Newton, Secant, Pade, Wegstein, Quasi-Newton, Aitkin/Steffensen, Homotopy, Bairstow (for polynomial roots), Goal Seek and Solver
7. Optimization: Solver, Luus-Jaakola, Quadratic, Golden Section, Powell, Downhill Simplex, Firefly, Constraints, Scaling and Sensitivity
8. Uncertainty and Risk Analysis: Bootstrap, Confidence Intervals, Law of Propagation, Monte Carlo Simulations with Latin Hypercube Sampling
9. Least-squares Regression: Linear, Nonlinear, LINEST, Gauss-Newton, Levenberg-Marquardt, Validation and Assessment, Uncertainty Analysis, Weighted Regression
10. Interpolation: Linear, Newton Divided Difference and Lagrange Polynomials, Rational, Bulirsh-Stoer, Pade, Stineman, Cubic, B, Akima and Constrained Hermite Splines, Bivariate Interpolation
11. Integration: Graphical, Trapezoidal, Midpoint and transformation for Improper Integrals, Romberg, Adaptive Simpson and Gauss-Kronrod, Multiple Integrals by Simpson, Kronrod and Monte Carlo
12. Initial-value Problems: Single Step Euler and Backward Euler, Implicit Trapezoidal for Stiffness, Variable Step Runge-Kutta Cash-Karp, Dormand-Prince, Multi-step Adams-Bashforth-Moulton, Differential-Algebraic Systems
13. Boundary-value Problems and Partial Differential Equations: Shooting, Finite Difference, Orthogonal Collocation, Quasilinearization, Method of Lines, Crank-Nicholson
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Editorial Review

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Richard Davis is a *Jean G. Blehart Distinguished Professor* of Chemical Engineering at the University of Minnesota Duluth. He earned Ph.D. and B.S. Chemical Engineering degrees from UCSB and BYU, respectively.

Professor Davis has over two decades experience teaching a variety of courses including computational methods, unit operations of momentum, heat and mass transfer, chemical reactor design, engineering economics, bioprocessing and green engineering.

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