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ChE **book review**

COMPUTATIONAL METHODS FOR PROCESS SIMULATION

by W. Fred Ramirez
Butterworths, 80 Montvale Ave., Stoneham, MA 02180; $52.95 (1991)

Reviewed by
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This book provides a thorough overview of the many facets of computations in the chemical engineering curriculum. The contents of the book are ordered along the lines of a typical undergraduate curriculum. Chapters 1 through 3 present overall material and energy balances and dynamics of lumped parameter systems. Students who have mastered simple ODEs will have no problem with this material. Chapter 2 also provides an introduction to the IMSL library. Indeed, the IMSL routines are exploited throughout the book, and readers who have always wanted to learn these routines will find many excellent applications in this book.

Chapters 4 and 5 deal with applications from unit operations: the chemical reactor and reaction kinetics, and separation (*e.g.*, multicomponent distillation) operations.

Chapter 6 starts with a summary of the microscopic equations of change, using the notation and sign conventions of *Transport Phenomena* by Bird, Stewart, and Lightfoot. Some details are omitted (*e.g.*, the constitutive equation for a Newtonian fluid) but with references to *Transport Phenomena*. These set the stage of modeling of distributed parameter systems and the BVP and PDE examples of chapters 7 and 8.

By covering a wide array of chemical engineering applications (unit operations, biochemical/biomedical processes, environmental modeling are some of the areas encountered), the author has woven into this book just about every computational method of utility to the chemical engineer, with coded (Fortran/IMSL) examples for those interested in immediate application of concepts to frequently encountered chemical engineering mathematical models.

Because the book covers the entire spectrum from introductory chemical engineering courses, *e.g.*, material and energy balances, to senior-level courses on process dynamics and process design, a course based on this book would have to come somewhere near the end of the curriculum, perhaps as a senior-level elective. The book may also be of value to those who have already mastered the typical chemical engineering curriculum, *e.g.*, the chemical engineering practitioner, and are now involved in some aspect of computational or mathematical modeling of chemical engineering processes. ❐