

through a carefully-crafted sequence of examples and encounters with various types of control-system substructures, one can expect to build in the students an expertise in control-system synthesis barely imagined just a few years ago. When we add to that the enthusiasm displayed by students in meeting such challenges, we are confident that we are getting better at this enterprise of engineering education.

REFERENCES

1. Foss, A.S., "UC ONLINE: Berkeley's Multiloop Computer Control Program," *Chem. Eng. Ed.*, **21**, 122 (1987) □

ChE book review

CHEMICAL REACTOR ANALYSIS AND DESIGN, *Second Edition*

by G.F. Froment and K.B. Bischoff

John Wiley & Sons, Inc., 1 Wiley Drive, Somerset, NJ 08875-1271; 664 pages, \$59.95 (1990)

Reviewed by

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Overall, I found this book to be quite suitable for a graduate-level course in reactor analysis, but too advanced for undergraduates. I disagree with the authors' statement in the Preface to the First Edition that the book may be used in a less-extensive treatment as a text for undergraduates. The chapters are not set up to clearly distinguish elementary from advanced material and there are relatively few simple, straightforward examples of elementary concepts that many undergraduates need in order to grasp the material. The style of writing is quite formal and compact. The overall level of mathematics is also too advanced for most undergraduates. In principle, such students have seen the matrix algebra, vector notation, and differential equations which are presented in this book. However, I believe that most undergraduates have little facility with these concepts, so that the mathematics becomes an impediment rather than a tool for understanding. The problems at the end of each chapter contain too few drill problems for simple concepts that undergraduates need in their homework assignments.

However, the above statements should not be taken as criticisms; the style and content of the text and problems are quite suitable for graduate students. The treatment of important concepts is up-to-

date and very well documented with literature references. Numerous summary paragraphs are included. While it might have been better to set these paragraphs off from the main body of the text, they are still quite useful. The table of symbols at the beginning of the book is also helpful. The detailed Table of Contents and the Author Index are excellent features, although the Subject Index is only average.

The treatment of chemical kinetics in Chapter 1 overreached itself in Example 1.4.4 and Section 1.6. The book does not pretend to be a text in physical chemistry (and rightly so). Hence, I found the treatment of transition state theory and the Lindemann mechanism to be so cursory as to be confusing. I would have mentioned these concepts in passing with only two or three sentences.

On the whole, however, it is a fine book. □

AN INTRODUCTION TO RHEOLOGY

by H.A. Barnes, J.F. Hutton, and K. Walters

Elsevier Science Publishers B.V., Amsterdam, The Netherlands; \$100 hardbound, \$65.75 paperback (1989)

Reviewed by

Charles Manke

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In the preface to *An Introduction to Rheology*, the authors acknowledge that rheology is a "difficult subject" and that those seeking an introduction are often discouraged by the mathematical complexity of standard textbooks. This new book aims to provide an understandable introduction to rheology for newcomers to the field, particularly those without strong backgrounds in mathematics. The mathematical content of the book is minimized by a strategic organization of the subject material that defers consideration of continuum mechanics and constitutive equations (where mathematical complexity is unavoidable) until the final chapter. However, certain mathematical treatments (such as the tensor representation of stresses) are regarded as essential, and they are used throughout the book. Overall, this approach is effective, and the authors succeed in presenting a well-balanced, understandable overview of rheology without oversimplification or lack of rigor.

The early chapters of the book focus on rheological phenomena, with individual chapters devoted to non-Newtonian viscosity, linear viscoelasticity, normal stresses, and extensional flow. Here the reader is introduced to the nature and origins of rheological

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