I doubt if you could start cold and learn the matrix approach from this book, but if you know a little about matrix algebra, the book is very helpful in making the application to chemical engineering calculations.

The same technique is repeated over and over in section 1 for equilibrium stage processes: distillation, absorption, leaching, and extraction. In each case, the book sets forth the basic principles, works a problem by the conventional method, then sets up the Newton-Raphson matrix for solution by computer. An excellent learning technique.

Obviously an equation-solving computer program is a necessity. The book skips over the step of solving the matrix, once it is set up. Not until chapter 4 is there an example simple enough to be solved by hand. It would be helpful if this example were earlier in the book, to give the novice a feel for the method and confidence that it works. Unfortunately there is a typographical error in the answer to this example, which will be somewhat confusing to the nonexpert.

Section 2 fails to inspire such enthusiasm. It deals with rate processes, and is limited almost entirely to the derivation of rate expressions for various models by the integral or integral-differential forms of material and energy balances. No aid to application is offered, and only once is it suggested that the Newton-Raphson method might be used to advantage. The problems in this section are all derivation exercises.

The last three chapters describe the results of field tests on several kinds of equipment. An optimization procedure is used to choose models which give the best fit to the product distribution which was obtained. The models are shown to give good agreement with data, but the procedures are not sufficiently well described to be useful to the inexperienced reader.

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Oxidation of Petrochemicals: Chemistry and Technology, Theodore Dumas and Walter Bulani, Halstead Press. 186 pages. $18.75

This small book is a carefully and critically written summary of most industrially important hydrocarbon oxidation processes used to produce petrochemicals. These processes are arranged into four chapters: (1) catalytic oxidations in homogeneous liquid phase, dealing with twenty catalytic and noncatalytic reactions; (2) heterogeneous catalytic oxidations dealing primarily with the production of phthalic anhydride, ethylene oxide, and acrylic acid; (3) catalytic dehydrogenations for production of styrene, butadiene, and related compounds; and (4) amoxidation of olefins, dealing primarily with acrylonitrile and methacrylonitrile production. Each process is described in detail including data on thermodynamics, kinetics, reaction conditions, processing and purification techniques, catalyst compositions and properties, comparison of processing differences as practiced by different companies, and other special problems.

The text is rich in quantitative detail. While the authors bring out the important points relevant to each process, they avoid being trapped by the mountainous array of oxidation technology details described in the literature. Although the authors have done an excellent job of selecting and summarizing the material, they have allowed an unusually large number of typographical errors to remain in the book. The authors' occasional (mis) use of organic names will certainly cause the organic chemist to look over the top of his eyeglasses (for example, use of *alkyl alkanes* as a general term for butane, butylene, isopentane, and isopentylene.) The description of catalyst function and mechanism is somewhat superficial and economic aspects are often too briefly covered. In spite of these minor shortcomings, however, the book is well worth reading by chemical engineers and industrial chemists concerned with this basic source of chemicals production.

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Thermodynamics (2nd Edition), J. P. Holman, McGraw-Hill Book Company, New York (1975). 590 pages. Prices not specified.

The field of thermodynamics is so broad that no single book can encompass all possible topics. Therefore, the value of a book is likely to be judged by the reader on the use to which he might put it. Holman's Thermodynamics is such a text. Many potential users will find it of importance because it develops the science from both the classical and the statistical points of view. On the other hand, since many chemical engineering students receive their introduction to statistical thermodynamics in courses in physical chemistry, other users might prefer that this coverage be eliminated in favor of the inclusion of such topics as phase equilibria which are omitted. Similarly, chemical engineering curricula normally contain full-year courses on kinetic theory and transport phenomena, so Chapter 9 will not be of major use to chemical engineering instructors in thermodynamics courses. They would prefer more extensive coverage of nonideal gas behavior.

It is, perhaps, unfair to judge a book on other than its own terms, and on this basis, the book under discussion can be considered very successful. It is so designed that the essential principles of thermodynamics can be covered in a single term by the appropriate selection of chapters. It is, therefore, ideally suited for such a single-semester course in any discipline. Further, the author is a mechanical engineer, and he undoubtedly envisions the application of his text more to that field than to chemical engineering. As such, it could be used for a two-semester course quite satisfactorily. Chemical engineering students would also benefit from the broader applications than are normally included in a text designed specifically for their use. However, while all chemical engineering instructors will find this book a useful addition to their library, they will need to supplement it considerably in those areas of their special interest. Since one hesitates to ask students to buy two texts, one for a general introduction and one for special applications, there are other texts better suited for chemical engineering courses of more than one term.

The book is well written and illustrated, and contains many examples worked out to show the applications. In addition there are numerous problems, and a solutions manual is available.

Professor Holman has also provided an unusual adjunct to his book, although this reviewer has not had the opportunity to examine it. One can purchase for $65 a series of self-study cassettes (nine hours running time) and a self-study guide ($2.95). While this material is not intended to replace class instruction, it should be useful not only to the beginning student but to those who have been away from formal instruction for some time and would like to brush up on their thermodynamics background. It will be interesting to see how this idea works out, but even without this self-study auxiliary material, this book can be used with profit by anyone wishing to compare the classical and statistical approach to thermodynamics theory and to see how theory can be applied in many areas, many of which are of interest to chemical engineers.

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