BOOK REVIEWS

Catalysis and Surface Science

Edited by H. Heinemann and G. A. Somorjai, Marcel Dekker, NY, 1985, $75.00 (U.S.A. and Canada), $90.00 (all other countries).

This is a compilation of papers presented at the Second Berkley Catalysis and Surface Science Conference, University of California (January, 1984). There are a total of 17 papers, 29 authors or coauthors and 32 others identified as contributors. For those persons or organizations functioning on a limited budget it should be noted that the papers have previously been published in Catalysis Reviews—Science and Engineering, Vol. 26, Nos. 3 and 4, (1985).

For those with the necessary financial security, the book is certainly worth the price. There are, as is typical of a symposium, papers of vastly different authoring philosophies and clarity but this reviewer believes the papers properly described as lucid and clear surpasses the number which are cryptic. There are three or four papers which are superb, properly describing their objective, a brief description of their results, how they obtained and evaluated their results, their facilities, their conclusions, and what further attention should be given to the subject. These also were easily readable and comprehensible.

In contrast there are a few authors who unfortunately have never developed the ability to organize and present their material clearly enough to transmit their thoughts to the one time listener or the once-through reader. There are also those who unfortunately cannot resist the temptation to "sell" a process by inadequately describing it and by making a sly reference to an engineering company who is marketing the process. The implication is that additional information may be obtained from this source. These may annoy the reader but do not detract from the value of the well-done subjects.

When one deals with a group there are always those deserving A^{+}'s and those barely passing, but when one grades this group, they deserve a composite high mark as do the editors.

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Potential Flows, Computer Graphic Solutions

By Robert H. Kirchhoff, Marcel Dekker, Inc., 1985, 181 pp., $45.00.

The breadth of coverage of the topic area is wide and far ranging. The topics covered are all useful as well as practical. Graphical representations of the various flow fields is excellent. The inclusion of computer code listings at the end of the book enables one to solve problems immediately.

The central weakness of the book is the depth of treatment of the various potential flow problems. It is too detailed for one knowledgeable about the theory of potential flow and not detailed enough for a novice. The text could usefully be replaced by a simple listing of formulas under appropriate headings. Additionally, the book would be more attractive to read if equations were numbered and centered and the index entries spaced closer together.

The best use of the book would then be as a reference manual together with a textbook on potential flow theory. Undergraduates would be served well this way. Graduate students could then use the book by itself.

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Heat Conduction

By Ulrich Grigull and Heinrich Sandner, translated by Joseph Kestin, Springer-Verlag, Hemisphere, 1984, 187 pp., $22.00.

This book gives a clear and concise introduction to the important concepts and applications of heat conduction. The authors set out to show how to obtain simple solutions to problems of practical importance with the minimum essential mathematics, and they have done this remarkably well. The approximate solutions and especially the interpretation should be understood by any student of heat transport; in many other texts these matters often receive scant attention in comparison to computational techniques. The book would be suitable as a supplementary text for a course in heat transfer or transport phenomena at the undergraduate level. However, because the treatment is restricted to conduction, chemical engineers will probably not find the work suitable as a primary textbook.

A variety of analysis techniques such as conformal mapping, Laplace transforms, graphical techniques, fictitious sources and sinks, and experimental analogs are used. The only numerical methods described are a finite difference solution of the one-dimensional parabolic conduction problem (largely through a graphical example) and the relaxation solution for steady-state. The discussion of these techniques and approximate solutions are self-contained and students with mathematical training through multivariable calculus and elementary differential equations should find the treatment accessible.

The eleven chapter titles are: Introductory Remarks; Transport Properties; One-Dimensional, Steady-State Heat Conduction; Steady-State Conduction in the Presence of Heat Sources; Steady-State Conduction in Several Dimensions; Nonsteady One-Dimensional Heat Conduction; Thermal Explosions; Continuously Operating Heat Sources; Moving Sources; Nonsteady Heat Conduction in Several Dimensions; and Nonsteady Heat Conduction with Phase Transition. There are several useful appendices containing physical property data, etc.

Professor Kestin has done an excellent translation. The book is attractively printed and essentially free from typographical errors.

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Chemical Process Computations

By Raghu Raman, Elsevier, 1985, 592 pp. $90.00.

This book contains a collection of algorithms and computer programs for solving the equations that describe a number of process engineering situations. It is intended to be a guide for both those interested in applying numerical methods to process and operations problems, as well as those seeking methods to solve modeling and simulation problems.

This reference book contains chapters on physical property estimation, mass and heat transfer, fluid flow, and reaction engineering. Within each chapter, a num-

ber of models, often of increasing complexity, are described. These descriptions are followed by well-documented computer programs paralleling the algorithms discussed written in modular form. Proven correlations, efficient algorithms, and reliable solution techniques are stressed throughout. All programs are written in ANSI FORTRAN IV and have been tested on an IBM 3033 computer, although in principle the routines may be modified for different situations, translated into other languages, or even adapted to run on personal computers.

In all, the book contains nearly one hundred computer routines for the solution of mathematical models of specific unit operations. It also contains a fine up-to-date concluding chapter describing alternative techniques for modeling entire processes, special problems that arise in such flowsheet simulation, and descriptions of some of the simulation packages now available to perform these tasks.

Although this book intentionally does not attempt to develop a fundamental understanding of chemical process unit operations nor of the formation of mathematical models to describe them, it should serve as a useful reference of both methods and programs for students and practicing engineers alike.

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