BOOK REVIEWS

Computer Programming Examples for Chemical Engineers by G. Ross, (Computer-Aided Chemical Engineering, Vol. 3) Elsevier, Amsterdam, 1987, (296 pages). US $87.75 (hardcover), US $48.75 (softcover), Programme diskette US $44.00.

The stated intention of this book is to encourage chemical engineers to write their own software for engineering applications. So, just as a book should not be judged by its cover, in this case it should not be judged purely by its title. The book contains more than just programming examples; the focus is upon presentation of worked examples illustrating application of a number of important numerical techniques to the solution of classical chemical engineering problems. In each case the author presents the example and/or the numerical method, follows it with the typical manual solution of the problem and then shows how this leads to a computer solution. This is a format which succeeds in presenting the numerical techniques in a context which is interesting to a chemical engineer and is a useful bridge between the disciplines of engineering, computer science and mathematics. This said, the book should not be considered as a complete reference book for any one of these fields; the coverage of numerical methods is not intended to be comprehensive and it is assumed that the reader is either familiar, or will rapidly grow familiar, with a suitable programming language. However, the book succeeds well in giving the reader confidence to write and use his or her own programs rather than relying on available software.

Some specific topics covered by the book are: flowsheeting, interpolation of physical data, solution of simultaneous equations using matrix algebra and iterative methods, and finite difference solutions of differential and partial differential equations. In a total of nine chapters, each devoted to a separate technique and application, the techniques are used to solve problems ranging from multiple effect evaporation and McCabe-Thiele distillation to non-steady state heat transfer and control problems. The choice of material and examples is generally good except for the somewhat surprising inclusion of "transportation problems" as a subsection of linear programming. I would prefer that space devoted to this topic be given, for example, to coverage of integration, or numerical differentiation. It is good to see that in most cases the emphasis is upon writing a program which will be useful in general application rather than just specific to the problem concerned. In all cases the techniques are well explained and the problems are interesting.

The book is written at a time when there is a proliferation in the use and availability of chemical engineering software for micro and mainframe computers. In this context the book is a valuable introduction to the construction of the type of software which sheds some light into what might otherwise be black-boxes. The book should be considered by any engineer who uses these packages and who would like some very basic insight into how such packages are put together. The chapter on flowsheeting is particularly good in this regard.

The book might also be considered as a supplementary textbook for an undergraduate process design or modelling course where students are asked to model specific unit operations either as a specific assignment or as part of a larger design. It is unfortunate that the cost of the book together with the price of the program diskette make it expensive for this type of use because undoubtedly the book is a valuable addition to the bookshelf.

In summary, the author has succeeded in writing a readable book which shows how numerical techniques together with a sound understanding of basic chemical engineering and computer programming techniques lead to useful computer programs. It is a good introduction to simulation and problem solving techniques and goes beyond the direct implications of the title, "computer programming examples for chemical engineers."

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Gas Purification, Arthur L. Kohl and Fred C. Riesenfeld, 4th Edition, 1985, 900 pages, Gulf Publishing Co. Book Division, Houston, Texas, USA, Can $59.95.

The purification of natural and industrial gases has been an important engineering problem since the turn of the century. The diversity of gas mixtures, mixture conditions and product specifications is immense and has led to the development of a large number of different processes and operating conditions. The basic objective of the book is to provide the reader with concise descriptions of the most important gas purification processes including their physico-chemical principles, equipment and operational characteristics such as performance, corrosion problems and solvent losses. As in the case of previous editions, Kohl and Riesenfeld succeed admirably in meeting their objective. The book contains a wealth of useful information, which is readily understood even by the non-specialist, and an extensive bibliography to the source literature.

The authors concentrate on the removal of hydrogen sulphide, carbon dioxide, sulphur dioxide, ammonia and water vapour from natural and industrial gases. However, the removal of less important compounds such as chlorine, hydrogen fluoride and light hydrocarbons is also covered quite extensively. The important processes include liquid solvent processes (based, for example, on alkonolamines, alkaline solutions, molten salts), solids adsorption and catalytic reaction. In the present edition, information on previously described processes has been updated and new material has been added on flue gas desulphurization (especially the Chiyoda Thoroughbred 121, Dowa and lime slurry processes) and acid gas removal by sterically hindered amines, to name just a few.

The book represents a very major effort by the authors and the following criticisms are merely motivated by the desire to enhance the quality of an already excellent text even further. The book would benefit from a more comprehensive treatment of enhancement factors and their role in chemical absorption processes. Without such treatment, the process information is sometimes disjointed. Similarly, in the case of adsorption, the equations governing breakthrough are merely cited from previous publications without presenting their derivations and evaluating their assumptions. Although the authors present some process parameters in SI units, many figures and tables are still given in Imperial units. The book contains an extensive collection of graphs, which are very useful for illustrative purposes and manual calcula-