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Applied Numerical Analysis, C. F. Gerald, Addison-Wesley Publishing Co., Reading, Massachusetts. (1970). 340 pages.

The development of high-speed digital computers has greatly changed the techniques by which engineers solve many of the problems they encounter in research, development, and design. It has become essential for engineering and science students to become familiar with the numerical methods needed in computer programs for solving large systems of linear equations, numerical integration of differential equations, and finding roots of equations, just to name a few. Although several textbooks covering numerical methods have been published in recent years, this new book will be of interest to many teachers because of the author's individual approach to the subject.

The author has designed the text for undergraduate students in mathematics, engineering, and science at the sophomore or junior level. A knowledge of calculus is assumed, and an introductory course in differential equations is probably needed if the chapters on that material are to be included in a course. Error analysis of the numerical methods is covered but is, of necessity, somewhat restricted because of the level of the text.

Emphasis throughout the book is on applications of numerical procedures, with many of the examples chosen from real physical situations. Each chapter begins with a discussion of numerical methods; this is followed by a discussion of the programming considerations for those methods.

There is enough material in the text for a full year's course. The topics include roots of equations, interpolation, numerical integration and differentiation, ordinary and partial differential equations, systems of linear equations, and curve fitting. The coverage of recent literature includes Romberg integration and a brief introduction to the use of cubic splines for curve fitting. The text is replete with examples, sample programs in FORTRAN, and problems for homework assignment. Many of the problems have answers given, which will be of help to students.

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Describing Chemical Engineering Systems, William E. Ranz, McGraw-Hill, (1970). 248 + xx pages. $9.95.

Often the most effective learning is accomplished by putting oneself actively into problem solving situations and by using new information in a purposeful way. Most college-level texts concentrate upon an orderly, expository presentation of subject matter, without emphasizing problem material. Professor Ranz has prepared a participation workbook in which much less than half the book is devoted to text material, and the main bill of fare is a large number of short problems which endeavor to develop the text material as the student uses it in the problems. Each set of problems dealing with a given area is followed by an answer-discussion section which gives solutions and stresses important points contained in the solutions.

The subject matter is basically that of a first chemical engineering course: energy and mass balances, stoichiometry, mathematical analysis of simple systems, elementary phase equilibrium, and simple and multistage separations. The author indicates that the book is suited for self-study or for use with a teacher. Because of the quite skimpy presentation of the textual material itself, it would be difficult to use the book as the sole text in an introductory course. Perhaps the best and most effective use would be as an intensive review by someone who had at some time in the past already taken a stoichiometry course. The book should be ex-

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