

warning is heeded, the proposed series should serve as a good introduction to current research in "information systems science."

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6[3, 13.15].—RALPH A. WILLOUGHBY, Editor, *Proceedings of the Symposium on Sparse Matrices and Their Applications*, IBM Corporation, Thomas J. Watson Research Center, Yorktown Heights, New York 10598.

The symposium was held at the Thomas J. Watson Research Center on September 9 and 10, 1968, with 124 registered participants representing many fields of application. Included in this volume are summaries of the talks, usually of about eight or ten pages, together with an "edited version" of a panel discussion forming the closing session.

The eigenvalue problem came up only during the panel discussions and the contributions were meager. Otherwise, only inversion and the solution of linear systems were discussed. The treatment of large sparse systems is not yet to be found in the textbooks, and only occasionally in the periodicals concerned with numerical analysis. But special techniques have been devised for linear programming problems and for the analysis of power networks, in particular, and these are described in the literature dealing with these areas. This seems to be the first effort to bring together mathematicians and programmers, and specialists in their diverse areas, in order to coordinate and systematize their work. It is claimed that in some cases 100-fold reductions are achieved. This, and the range of applications, provide impressive evidence of the worthwhileness of the project.

The novice will not find in this an easy introduction to the subject in general or to any one technique in particular. But he can find indications of the various methods of approach and sometimes extensive lists of publications for further study. And the expert may well learn of other approaches he had not previously come across.

A. S. H.

7[3].—J. A. WILKINSON, *Rundungsfehler*, translated from English into German by G. Goos, Springer-Verlag, New York, 1969, x + 208 pp., 21 cm. Price \$3.70 (paperbound).

This translation contains minor corrections of the earlier English version: *Rounding Errors in Algebraic Processes*. See review RMT 90, vol. 18, no. 88, p. 675.

E. I.

8[3].—H. R. SCHWARZ, H. RUTISHAUSER & E. STIEFEL, *Numerik Symmetrischer Matrizen*, B. G. Teubner Verlag, Stuttgart, 1968, 243 pp., 22 cm. Price DM 34 —.

The names of the three authors should be sufficient to recommend this book to

anyone interested in the material covered. Hence the reviewer's job is simplified. It is sufficient to indicate what material is covered. The title as it appears on the cover is "Matrizen-numerik" which is a bit misleading, but the proper title, given above, is sufficiently explicit. Only real symmetric matrices are considered.

There are five chapters. The first is elementary, introducing linear vector spaces, and norms and condition numbers, then passing to conditions for definiteness, and finally developing the method of Cholesky. The next chapter is on "relaxation methods" including, of course, the conjugate gradient method. Next comes the least-squares problem with the Schmidt orthogonalization. The eigenvalue problem, Chapter 4, takes up the most space, 90 pages, and the book concludes with something over forty pages on boundary value problems. There is a bibliography of 80 items, and a five-page index. Several ALGOL programs are included, and a number of numerical illustrations, but familiarity with ALGOL is no prerequisite. On the whole, this is a clear, careful, and authoritative exposition requiring very little for background.

A. S. H.

9[3].—DONALD D. SPENCER, *Game Playing with Computers*, Spartan Books, New York, 1968, 441 pp., 24 cm. Price \$12.95.

Game Playing with Computers is written by an amateur games player who is a novice at computing and an even greater amateur at book writing. By extending the notion of a "game" to include any sort of recreational aspect of computing, the author has assembled a strange mishmash of information. The book will delight freshman students of computing, since it includes complete programs (some in Fortran, some in Basic) for playing Blackjack, the 15 Puzzle, constructing magic squares, and sifting small primes. Flowcharts are given for playing Tic-Tac-Toe, Roulette, and the construction of knight's tours. In almost all cases, the packaged solutions represent bad computing in the sense of using brute force rather than intelligence.

Many games are described without relating them in any way to the book's title. In one case (Checkers and Kings), a flowchart and program are given for which the point seems to be the logic of counting the elements in an array. In several instances, the author throws in photographs of the punched cards he used (very badly reproduced by the publisher).

It is difficult to deduce the point of this book, or its possible audience, or just where a computer enters the game. It might be that it will reduce the number of student programs to play Tic-Tac-Toe (or then it might increase the number), but it will hardly foster any good computing. Perhaps the greatest value of the book is in its descriptions of many games of chance, most of which are presented with no suggestion of how to apply a computer to their analysis.

Brief appendices provide a reference list of books and articles on game playing and descriptions of the Fortran and Basic languages.

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