REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the revised indexing system printed in Volume 28, Number 128, October 1974, pages 1191–1194.

8 [3, 3.25].– JAMES R. BUNCH & DONALD J. ROSE, Editors, *Sparse Matrix Computations,* Academic Press, New York, San Francisco, London, 1976, xi + 453 pp., 24 cm. Price $15.00.

This volume contains the proceedings of a Symposium at Argonne National Laboratory on September 9–11, 1975. Twenty-six papers are presented, collected under the six headings of: I. Design and analysis of elimination algorithms, II. Eigenvalue problems, III. Optimization, least squares and linear programming, IV. Mathematical software, V. Matrix methods for partial difference equations, VI. Applications. The collection gives a comprehensive view of the field at the time.

LARS B. WAHLBIN

Department of Mathematics
Cornell University
Ithaca, New York 14853

9 [3.10, 3.15, 5, 12.05.1].–KLAUS-JÜRGEN BATHE & EDWARD L. WILSON, *Numerical Methods in Finite Element Analysis,* Prentice-Hall, Englewood Cliffs, N. J., 1976, xv + 528 pp., 23.5 cm. Price $28.95.

This book treats most aspects of the formulation and construction of a computer program for linear finite element analysis using a conforming displacement approach. The topics involving choice of shape functions, formulation and numerical evaluation of element matrices, global assembly and solution of the equilibrium equations are given in detail, frequently with computer subroutines as examples.

One special feature which distinguishes this book from many others is the major portion devoted to eigenproblems.

I shall next reproduce a list of contents.

Part I, Matrices and Linear Algebra.
   1. Elementary Concepts of Matrices. 2. Matrices and Vector Spaces.
Part II, The Finite Element Method (FEM).
   3. Formulation of the FEM. 4. Formulation and Calculation of Isoparametric FE matrices. 5. Variational Formulation of the FEM. 6. Implementation of the FEM (with a full program example).
Part III, Solution of FE Equilibrium Equations.
   7. Solution of Equilibrium Equations in Static Analysis. 8. Solution of Equilibrium Equations in Dynamic Analysis. 9. Analysis of Direct Integration Methods. 10. Preliminaries to the Solution of Eigenproblems. 11. Solution Methods for Eigenproblems. 12. Solution of Large Eigenproblems.

The exposition is clear and readable but not concise. Generally true to the title, basic numerical principles are discussed in some detail, and thereafter applied to finite element analysis. Topics not treated at length in the text (like nonconforming methods, assumed stress field and other formulations, bandwidth reducing algorithms) are adequately referenced. Practical hints are given, sometimes without much motivation (e.g., p. 102 for averaging of stresses, p. 165 for recommendation of orders for numerical integration).