

exploited by the authors to give a self-contained development of degree theory. Part II, comprising over 1/3 of the book, contains the applications. An enthusiastic discussion is given of equilibrium programming and its philosophical implications. The other applications are shown to be special cases of equilibrium programming, and, in all cases, continuation arguments are used to prove the existence theorems for these applications. Part III covers algorithms. The traditional numerical analyst will be disappointed here. In the differential case, continuation uses a mixture of techniques drawn from the numerical solution of ordinary differential equations and the local numerical solution of nonlinear systems. Both of these subjects have been developed to a high degree, and the treatment in this book does not reflect this development. On the combinatorial side, the authors do not give any specific triangulations, or discuss the relative merits of different triangulations. They give no algorithms or computer programs. What they do provide is a lucid account of the ideas that go into the simplicial and differentiable methods for path following. Part IV contains a chapter on the calculation of all complex solutions of polynomial systems, two chapters on the linear complementarity problem, a chapter on the Kakutani fixed point theorem, and a final chapter giving an intuitive discussion of the Sard and Weierstrass theorems.

The book provides a broad picture, with some technical mathematical details left to journal articles. It is well written, often using vivid images to illustrate the mathematical ideas. Each chapter concludes with a number of exercises. It should have a salutary effect in the dissemination of ideas from numerical analysis and applied topology to an audience that includes students of economics, operations research, and game theory.

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**10[65-06].**—P. ROZSA (Editor), *Numerical Methods*, Colloquia Mathematica Societatis János Bolyai, Vol. 22, North-Holland, Amsterdam and New York, 1980, 631 pp., 24 cm. Price \$87.75/Dfl. 180.00.

This volume contains 41 lectures delivered at the Colloquium on Numerical Methods held in Keszthely, Hungary, from September 4–10, 1977. The papers cover the following areas of numerical mathematics: ordinary and partial differential equations including initial value, boundary value, and stiff problems; numerical algebra such as matrix eigenvalue problems, generalized matrix inverses, recursive computations; unconstrained and constrained optimization; elliptic functions; applications of splines.

**11[65-06].**—C. A. BREBBIA (Editor), *Boundary Element Methods*, Springer-Verlag, New York, Heidelberg, Berlin, 1981, xxiv + 622 pp., 23½ cm. Price \$59.00.

This is the proceedings of the Third International Seminar held at Irvine, California, in July, 1981. It contains 39 papers divided into the following sections: I Potential and Fluid Flow Problems, II Elasticity Problems, III Geomechanics, IV

Material Problems, V Numerical Techniques and Mathematical Principles, VI Coupling of Boundary and Finite Element Methods.

**12[65–06].**—R. NOYE (Editor), *Numerical Solutions of Partial Differential Equations*, North-Holland, Amsterdam and New York, 1982, xii + 648 pp., 23 cm. Price \$93.00/Df. 200.00.

This is the proceedings of a conference on the Numerical Solutions of Partial Differential Equations held at Queen's College, Melbourne University, Australia, from August 23–27, 1981. It contains six invited contributions and twenty papers describing recent refinements of the various numerical techniques used to solve partial differential equations.