12. C. A. Schnepper and M. A. Stadtherr, *Application of a parallel interval Newton/generalized bisection algorithm to equation-based chemical process flowsheeting*, Lecture at the conference *Numerical Analysis with Automatic Result Verification*, Lafayette, LA, Feb. 1993.
13. A. Törn and A. Žilinskas, *Global optimization*, Lecture Notes in Comput. Sci., vol. 350, Springer, Berlin, 1989.
14. W. I. Zangwill and C. B. Garcia, *Pathways to solutions, fixed points, and equilibria*, Prentice-Hall, Englewood Cliffs, NJ, 1981.

24[90B05, 90C35].—JAMES R. EVANS & EDWARD MINIEKA, *Optimization Algorithms for Networks and Graphs*, 2nd ed., Dekker, New York, 1992, x + 470 pp., $23\frac{1}{2}$ cm. Price $59.75.

This book gives a treatment of network optimization that manages to be both inviting and mathematically rigorous. Though network optimization courses vary according to individual interests and preference, the topics covered in this book are likely close to the right ones for the majority of the courses of that title taught in mathematics, engineering, and possibly even computer science departments:

- Basic Graph Theory
- Basic Data Structures and Complexity
- Minimum Spanning Trees and Branchings
- Shortest Paths
- Minimum-Cost Flows
- Maximum Flows
- Matchings (including maximum-weight matchings in arbitrary graphs)
- Chinese Postman
- Traveling Salesman Problem
- Location
- PERT

A major strength of the book is its gentle approach, making it very readable. Each chapter begins with several motivating applications handled by the models in the chapter. The algorithms are stated nicely and rigorously proved correct. Details of the algorithms applied to examples are included. The exercises include algorithm execution, theory, applications, with emphasis on the first of the three.

A second strength of the book is the accompanying software package, for use on DOS machines. I know of none more extensive for use in such a course. The software is easy to use and well documented. Unfortunately, it provides no graphics.

The book is appropriate for an introductory course at the undergraduate or even the graduate level. It should not be taken as a complete research reference, however. Treatment of network optimization advances of the last decade is scant. (One obvious omission is the mention of strongly polynomial methods for minimum-cost flows.)

The authors' preface includes the following apt description:

> ... The focus is on an intuitive approach to the inner workings, interdependencies, and applications of the algorithms. Their place in the hierarchy of advanced mathematics and the details of their computer coding are not stressed....

I think this book succeeds in providing the novice a broad and enticing introduction to the subject of network optimization.

COLLETTE COULLARD

Department of Industrial Engineering
and Management Sciences
Northwestern University
Evanston, IL 60208

25[42–01, 42A38, 65T10].—JAMES S. WALKER, *Fast Fourier Transforms*, Studies in Advanced Mathematics, CRC Press, Boca Raton, FL, 1991, xiv + 319 pp., 24 cm. Price $59.95.

This is another addition to the growing textbook literature on the FFT, and the emphasis here is on the interplay between the FFT and classical Fourier analysis and on applications of the FFT to the practice of Fourier analysis. A very attractive feature of this book is the inclusion of computer software, called *Fourier Analysis Software*, in the form of a disk that can be used on any PC operating under DOS version 2.1 and up. With this software the reader can generate computer images of Fourier series, Fourier transforms, filtered Fourier transforms, and convolutions.

After giving a brief summary of the basic theory of Fourier series in Chapter 1, the author introduces the discrete Fourier transform, together with discretizations of Fourier sine and Fourier cosine series, in Chapter 2. Chapter 3 presents the heart of the matter, the fast Fourier transform, but it concentrates on Buneman's methods, which, in the author's opinion, deserve more prominence. The topic of Chapter 4 is applications of Fourier series, for instance to the heat and wave equations, to Schrödinger's equation for a free particle, and to filters in signal processing. Chapter 5 discusses the fundamentals of Fourier transforms, Fourier inversion, and convolution and covers also Poisson summation, the sampling theorem, and aliasing. An introduction to Fourier optics is given in Chapter 6. Appendix A contains the user's manual for *Fourier Analysis Software* and Appendix B lists some computer programs written in the language QuickBASIC.

The book is well paced for students of applied areas such as electrical engineering and physics, and this is mainly the audience the author had in mind, since mathematical technicalities are kept to a minimum.

H. N.