finite element discretizations that can be quite useful by indicating what (and what not) to expect from a fully debugged finite element computer code.

The basic goal of Ciarlet's book is to report on the mathematical investigations into various finite element methods for discretizing elliptic problems, with a focus on many of the more successful ideas that have been put forward in engineering practice. In this regard, it shares a common goal with the earlier book by Strang and Fix, *An Analysis of the Finite Element Method*, Prentice-Hall, Englewood Cliffs, N.J., 1973. Thus, to describe Ciarlet's work in more detail, perhaps it is fruitful to contrast it with that of Strang and Fix.

One obvious difference between the two books is that Ciarlet has written with much more mathematical rigor and detail. His book is aimed toward a mathematically sophisticated audience, whereas Strang and Fix sought to appeal to a broad readership. Moreover, Ciarlet's treatment is more like a treatise (contrary to his view expressed in the first sentence of the preface) in that the subjects included are treated completely, without many unsettled issues and conjectures. In contrast, Strang and Fix gave, in many cases, only preliminary arguments and sought thereby to give direction for future research. Thus, someone wanting a leisurely introduction to finite elements would be best advised to peruse first the book by Strang and Fix, coming later to Ciarlet's book for a more complete statement of results and proofs.

In addition to presenting material at a higher level of rigor and completeness, Ciarlet's book also reflects mathematical advances made in several areas since the writing of Strang and Fix: nonlinear problems, mixed methods, maximum-norm estimates, shell problems, etc. On the other hand, Strang and Fix provided a chapter each on the subjects of eigenvalue approximation and problems with singular solutions, while Ciarlet only gives these subjects brief mention. And, as the title suggests, Ciarlet focuses only on time-independent problems; in the book by Strang and Fix, one finds a chapter on parabolic and hyperbolic problems.

Perhaps the only drawback to Ciarlet's excellent monograph is its price, a shortcoming shared by all advanced research texts today. The recent appearance of a paper-back version of the book softens the blow; further, for the purposes of a graduate course on finite elements, one could consider the lecture notes by Ciarlet, *Numerical Analysis of the Finite Element Method*, Presses de l'Université de Montréal, 1976. These were a precursor to the larger monograph and have been used successfully as the text in graduate mathematics courses at the University of Michigan, for about one-fifth of the price of the monograph. With the more complete monograph on reserve in the library, this can offer students a low-budget introduction to finite element methods without a great sacrifice of mathematical content.

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7[2.05].–WALTER SCHEMPP & KARL ZELLER, Editors, *Multivariate Approximation Theory*, International Series of Numerical Mathematics, Birkhäuser Verlag, Basel, Switzerland, 1979, 455 pp., 24 cm. Price $38.00.

This volume contains papers presented at a meeting organized by the editors.

This meeting took place at the Mathematical Research Institute at Oberwolfach, Germany, from February 4–10, 1979.

8[4.15].–J. ALBRECHT, L. COLLATZ & K. KIRCHGASSNER, Editors, *Constructive Methods for Nonlinear Boundary Value Problems and Nonlinear Oscillations*, International Series of Numerical Mathematics, Birkhäuser Verlag, Basel, Switzerland, 1978, 190 pp., 24 cm. Price $26.80.

This volume contains papers presented at a meeting organized by the editors. This meeting took place at the Oberwolfach Mathematical Research Institute, Oberwolfach, Germany, from November 19–25, 1978.

9[5.00].–I. GLADWELL & R. WAIT, Editors, *A Survey of Numerical Methods for Partial Differential Equations*, Clarendon Press, Oxford, 1979, x + 424 pp. Price $34.95.

This book is based on material presented at a Joint Summer School in July 1978, organized by the Department of Mathematics, University of Manchester and by the Department of Computational and Statistical Science, University of Liverpool. It is divided into 5 parts: Numerical Methods of Elliptic Equations, Numerical Methods for Parabolic Equations, Finite Difference and Finite Element Equations (iterative and direct methods for their solution), Free and Moving Boundary Problems, Hyperbolic Equations. There are twenty-three chapters with fifteen authors. Many topics are touched upon and the treatment is generally superficial.

10[6.15].–H. J. J. TE RIELE, Editor, *Colloquium Numerical Treatment of Integral Equations*, Mathematisch Centrum, Amsterdam, 1979, 259 pp., 24 cm. Price Dfl. 31,––.

This volume contains eleven papers which represent extended versions of lectures presented during the period of October 1978 to May 1979 at the Mathematical Centre, Amsterdam. It is divided into general numerical methods and applications.

11[2.00].–R. ANSORGE, K. GLASHOFF & B. WERNER, Editors, *Numerical Mathematics*, International Series of Numerical Mathematics, Birkhäuser Verlag, Basel, Switzerland, 1979, 207 pp., 24 cm. Price $28.00.

This volume contains papers presented at a symposium on the occasion of the retirement of Lothar Collatz organized by the editors. This meeting took place at the Institute for Applied Mathematics, University of Hamburg, from January 25–26, 1979.