the numerous illustrations. (Curiously, the grossly incorrect Figure 5.2(b) for the midpoint rule went unnoticed.) What I missed most is a systematic introduction of the concept of condition, beyond the discussion in the context of linear equations.

It would also have been nice to have a general chapter on numerical software, with detailed references for each subject area. An innocent reader of this text may rather be tempted to program his (or her) own routines than to resort to the well-known software packages.

On the whole, this is a refreshingly written presentation of wide areas of our field and a welcome addition to the textbook literature.

H. J. S.

18[65N30].—J. R. WHITEMAN (Editor), *The Mathematics of Finite Elements and Applications* IV, MAFELAP 1981, Academic Press, London, New York, 1982, xvi + 555 pp., $23\frac{1}{2}$ cm. Price $40.50.

This volume contains 44 papers and 39 abstracts of poster session papers presented at the fourth conference on The Mathematics and Finite Elements and Applications held at Brunel University, England, from April 28–May 1, 1981.

19[65K10].—M. J. D. POWELL (Editor), *Nonlinear Optimization* 1981, Academic Press, London, New York, 1982, xvii + 559 pp., $23\frac{1}{2}$ cm. Price $39.50.

This volume is based on the proceedings of the NATO Advanced Research Institute held at Cambridge from July 13–24, 1981. There are 31 invited papers divided into the following chapters: Unconstrained Optimization, Nonlinear Fitting, Linear Constraints, Nonlinear Constraints, Large Nonlinear Problems, The Current State of Software, and Future Software Testing. Each chapter ends with a discussion of that particular topic.

20[65–00].—R. GLOWINSKI & J. L. LIONS (Editors), *Computing Methods in Applied Sciences and Engineering* V, North-Holland, Amsterdam, New York, 1982, x + 668 pp., 23 cm. Price $95.00.

This is the proceedings of the Fifth International Symposium on Computing Methods in Applied Sciences and Engineering held at Versailles, France, from December 14–18, 1981. It contains 41 papers on the following topics: Numerical Algebra, Stiff Differential Equations, Parallel Computing, Approximation of Eigenvalues and Eigenfunctions-Bifurcation, Wave Propagation, Nonlinear Elasticity, Fluid Mechanics, Plasma Physics, Turbulence, Semiconductors, Biomathematics, and Inverse Problems.

21[12A50].—FRANCISCO DIAZ Y DIAZ, *Tables Minorant la Racine n-ième du Discriminant d'un Corps de Degré n*, Publications Mathématiques d'Orsay, France, 1980, 60 pp., 30 cm. Price—not available.

Let K be a number field of degree n, and let d be the absolute value of its discriminant. Odlyzko [3] showed how to give lower bounds for $d^{1/n}$. Subsequent work was done by Serre and Poitou [5]. In the present work, the author uses Poitou's formulas to calculate such lower bounds in the following cases: Table 1: K totally imaginary, $2 \leqslant n \leqslant 4000$; Table 2, K totally real, $1 \leqslant n \leqslant 2000$; Table 3: all K with

$1 \leqslant n \leqslant 10$. The estimates in Table 3 are better than those listed in the other three tables since certain local contributions are taken into account; Table 4: all K with $1 \leqslant n \leqslant 100$. The numbers in the tables are truncated to eight decimal places.

The calculations needed to obtain the optimal values from Poitou's formulas can be shortened if one accepts slightly inferior values. The accuracy of some of these approximations is investigated in some preliminary Tableaux (not to be confused with the Tables).

Earlier, less extensive tables of lower bounds for $d^{1/n}$ had been given by Odlyzko [4] and Poitou [5]. There are also some unpublished tables of Odlyzko (see [6]). The estimates in the present work are much better than those in [4], slightly better than the limited table of [5], and appear to be slightly better than the unpublished table of Odlyzko (see [6, p. 705]). In [2], some bounds were also computed under the assumption of the Generalized Riemann Hypothesis, and some explicit examples are given, which show that the estimates are reasonably sharp. In [1], the existence of infinite class field towers is used to give an upper bound for these lower bounds for n large.

Lower bounds for $d^{1/n}$ have been used by Masley and van der Linden [6] to calculate the class number of totally real abelian number fields.

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1. J. MARTINET, "Tours de corps de classes et estimations de discriminants," *Invent. Math.*, v. 44, 1978, pp. 65–73.

2. J. MARTINET, *Petits Discriminants des Corps de Nombres*, Journées Arithmétiques 1980 (ed. by J. V. Armitage), Cambridge Univ. Press, 1982, pp. 151–193.

3. A. ODLYZKO, "Some analytic estimates of class numbers and discriminants," *Invent. Math.*, v. 29, 1975, pp. 275–286.

4. A. ODLYZKO, "On conductors and discriminants," in *Algebraic Number Fields* (ed. by A. Fröhlich), Academic Press, London and New York, 1977, pp. 377–407.

5. G. POITOU, *Sur les Petits Discriminants*, Séminaire Delange-Pisot-Poitou, Théorie des Nombres, 18e année 1976/77, exp. no. 6.

6. F. VAN DER LINDEN, "Class number computations of real abelian number fields," *Math. Comp.*, v. 39, 1982, pp. 693–707.