15[65–01].—GENE H. GOLUB & JAMES M. ORTEGA, *Scientific Computing and Differential Equations—An Introduction to Numerical Methods*, Academic Press, Boston, 1992, xi+337 pp., $23\frac{1}{2}$ cm. Price $49.95.

This is a revision of "An Introduction to Numerical Methods for Differential Equations" by J. M. Ortega and W. G. Poole, Jr., Pitman Publ., 1981. The new version has the subtitle "An Introduction to Numerical Methods", which emphasizes that this text uses the numerical treatment of differential equations as a vehicle for discussing fundamental topics of numerical mathematics.

This concept goes back to the preceding version; it has been strengthened by the amplification of some sections dealing with subjects other than differential equations, notably linear equations and least squares. As in the earlier version, one feels that the authors are really more at ease when dealing with systems of equations, eigenvalues, etc. rather than with the numerical treatment of differential equations. While the level of exposition is elementary in both areas, the text is appreciably more concise and definitive in its formulations in the algebraic sections than it is in the analytic ones. For example, ill-conditioning is not discussed in the context of initial value problems, where it is first met, but only with linear systems of equations; the discussion of roundoff effects is much more vague in differential equations than in algebraic problems, etc. The fundamental distinction between the numerical solution behavior for initial value problems as $h \to 0$ on a fixed finite interval, and as the interval length grows for a fixed small h, remains as vague as the criteria upon which a step-size control may be based and what they effect. On the other hand, there are excellent introductory expositions on the least squares problem and orthogonal polynomials, on projection methods, and on the direct and iterative methods for solving large sparse systems coming from partial differential equations, and the like. The weaknesses go back to the original version; it is a pity that they have not been eliminated in the revision.

On the other hand, it is a tribute to the authors of the original text that the first chapter "The World of Scientific Computing" needed very little updating except in the hardware section and in the treatment of visualization and symbolic computation. Also, the refreshingly original basic concept of the text has remained a challenge over the past ten years. The many exercises have remained a great asset.

Altogether, I would recommend the book as a text for an introductory course in numerical analysis (on the right level), but not as an introduction to scientific computation and differential equations. Thus, the inclusion of the subtitle in a quotation of the title appears to be necessary to avoid any misleading impression.

H. J. S.

16[65–02].—WILL LIGHT (Editor), *Advances in Numerical Analysis*, Vol. I: *Nonlinear Partial Differential Equations and Dynamical Systems*, Clarendon Press, Oxford, 1991, x+275 pp., 24cm. Price $52.00.

This book is the first of two planned volumes containing notes from a series of lectures delivered at the fourth Summer School in Numerical Analysis held