In the preface the authors express their hope that the monograph justifies their opinion that "not only the ABS approach is a theoretical tool unifying many algorithms which are scattered in the literature but also that it provides promising and, in some cases, proven effective techniques for computationally better algorithms for a number of problems". While being in complete agreement with the authors on the first statement, we have some reservation concerning the second one. This does not mean that no competitive software for linear and nonlinear systems could be based on the ABS approach. We only want to say that there is still a lot of work to be done.

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6[65H10, 65L10, 65M60, 58C27].—HANS D. MITTELMANN & DIRK ROOSE (Editors), *Continuation Techniques and Bifurcation Problems*, International Series of Numerical Mathematics, Vol. 92, Birkhäuser, Basel, 1990, 218 pp., 24 cm. Price $52.00.

This volume of invited articles addresses aspects of the computational analysis of parameter-dependent nonlinear equations. Twenty-seven authors, all active in the field, have contributed thirteen papers which may be loosely categorized into four groups.

The first group concerns numerical continuation techniques for problems with one real parameter. E. L. Allgower, C. S. Chie, and K. Georg discuss continuation in the case of large sparse systems. Continuation methods for variational inequalities are treated in papers by E. Miersemann and H. D. Mittelmann, and—using multigrid approaches—by R. H. W. Hoppe and H. D. Mittelmann. The applications of continuation procedures to partial differential equations modeling semiconductor devices are studied by W. M. Coughran, Jr., M. R. Pinto, and R. K. Smith. A continuation process involving damped Newton methods is analyzed by R. E. Bank and H. D. Mittelmann.

The papers in the second group involve symmetry in the study of bifurcation phenomena. The computation of symmetry-breaking bifurcation points for a class of semilinear elliptic problems is discussed by C. Budd. M. Dellnitz and B. Werner show how group-theoretic methods can be employed in the detection of bifurcation points and the computation of (multiple) Hopf points. For a two-parameter problem, symmetry is used by A. Spence, K. A. Cliffe, and A. D. Jepson in the computational determination of branches of Hopf points.

The third group consists of papers on the computational analysis of higher singularities. A. Griewank and G. W. Reddien develop a method for the computation of cusp catastrophes for steady-state operator equations and their discretizations. Numerical experiments on the interaction between fold points and

Hopf points in certain two- and three-parameter problems are presented by B. DeDier, D. Roose, and P. VanRompay. C. Kaas-Petersen examines the Gray-Scott model of isothermal autocatalytic processes when the standard symmetry is broken by unequal boundary conditions and events with higher codimension occur.

Finally, the fourth group of papers concerns parameter-dependent time-dependent systems. The computation of heteroclinic orbits connecting two saddle points is discussed by E. J. Doedel and M. J. Friedman, and E. Lindtner, A. Steindl, and H. Troger study the loss of stability of the basic periodic motion of a robot.

The results in this volume certainly provide an interesting contribution to this very active area.

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7[65-01, 65D07, 65L60, 65N30].—P. M. PRENTER, *Splines and Variational Methods*, Wiley Classics Edition, Wiley, New York, 1989, xi + 323 pp., 23 cm. Price: Softcover $24.95.

This is a reprint of a book first published in 1975 and now elevated to the status of a "classic", in good company with other books in the Wiley Classics Library such as Courant-Hilbert, Curtis-Reiner and Dunford-Schwartz. It is intended as an introduction to the subject of its title, aimed at first-year graduate students in engineering and mathematics. To quote from the Preface: "... to introduce them gradually to the mathematician's way of thinking ... "; "... a book on the subject that could be read by ordinary mortals ... ". Basic concepts of one-dimensional and multivariate polynomial and piecewise polynomial interpolation are covered and then finite element and collocation methods for differential equations. Concepts, e.g., from elementary functional analysis, are introduced as needed.

The book is much in the spirit of Strang and Fix's influential 1973 book [3], although it does not try to cover the then research frontier as [3] did. Prenter's book includes more of "classical" approximation theory.

It is a very pleasant and well-written book. However, some parts of it have not aged well in the decade and a half since its publication, and it cannot now be used as a textbook. I proceed to give two examples of why.

First, although there is a "guest" reference to Bramble and Hilbert 1970 on p. 271, the Bramble-Hilbert lemma is not stated or used. Consequently, error estimates for multivariate approximation are restricted to the maximum (Tchebycheff) norm, although they are later applied to energy and L_2 estimates. Excessive, in many applications fatal, smoothness demands result. Also, as was common before the Bramble-Hilbert lemma, the estimates in approximation theory are slugged out on a tedious case by case basis (which sometimes may