was also made in my copy of the book: the binding was attached upside-down!

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4[34-00, 35-00].—DANIEL ZWILLINGER, *Handbook of Differential Equations*, 2nd ed., Academic Press, Boston, 1992, xx + 787 pp., $23\frac{1}{2}$ cm. Price $54.95.

The first edition of this book was published in 1989 and has been reviewed in [1]. That a second edition is appearing just three years after the first attests to the success of, and continued demand for, the book.

The principal changes made by the author are as follows. In Part I, dealing with basic concepts and transformations, new paragraphs have been added on chaos in dynamical systems, existence and uniqueness theorems in ODEs and PDEs, inverse problems, normal form of ODEs, and stability theorems for ODEs. Prüfer and modified Prüfer transformations, which originally appeared in Parts II and III, respectively, have been moved to Part I. Part II on exact methods has a new paragraph on exact first-order PDEs. The most extensive changes occur in Part IV, dealing with numerical methods, where one finds a reworked paragraph on available software, a long new paragraph on software classification, including excerpts from the GAMS manual, and new sections on finite difference methodology, grid generation, stability concepts in numerical ODEs, multigrid methods, parallel computer methods, and lattice gas dynamics (particle methods). In addition, many minor improvements have been made throughout the book: new examples, additional notes, and updated bibliographies. All in all, the text has expanded from the original 635 pages to 760 pages.

It should be clear from this brief review that the new edition of this reference work continues to be a useful aid to scientists and engineers and will be indispensable to anybody who needs to solve differential equations.

W. G.

1. W. F. Ames, Review **1**, Math. Comp. **54** (1990), 479–480.

5[65-06, 65Y05, 68-06].—JACK DONGARRA, PAUL MESSINA, DANNY C. SORENSEN & ROBERT G. VOIGT (Editors), *Parallel Processing for Scientific Computing*, SIAM, Philadelphia, PA, 1990, 454 pp., $25\frac{1}{2}$ cm. Price: Softcover $49.50.

This collection of 83 papers and short abstracts from the 1989 SIAM Conference on Parallel and Scientific Computing covers five areas: matrix computations, numerical methods, differential equations, massive parallelism, and performance and tools. Papers range from theoretical studies to performance evaluation to descriptions of software systems. Many of the major researchers in these fields are represented, and these papers give a good overview of research in this fast-changing area as of 1989. Many of the topics are still current, and thus many of the papers remain valuable. In this short review we will simply list the topics covered, since the number of papers is too large to mention each one individually.

In the section on matrix computations there are papers on block algorithms for dense matrix problems, sparse ordering and factorization algorithms, symmetric and nonsymmetric eigenvalue problems using QR, Lanczos, and bisection algorithms, and condition estimation.

The numerical methods papers cover bifurcation computations, asynchronous PDE solvers, linear and nonlinear optimization, homotopy methods, weather modeling, Navier-Stokes solvers, power-flow computations, ODE solvers, and parallel FFTs.

The differential equations papers cover multicolor elliptic solvers, fast Poisson solvers, elliptic solvers using domain decomposition, implicit and explicit parabolic solvers, stiffness matrix generation, nonlinear hyperbolic solvers, and aerodynamic applications.

The section on massive parallelism includes finite element computations, computational fluid dynamics, computing sparse approximate inverses, transportation optimization and molecular dynamics on the CM-2, load balancing, interprocessor connection networks, scheduling recurrence solvers, solving systems of conservation laws, the DINO language, and systolic arrays.

The section on performance and tools covers the PARTI runtime support system, automatic blocking of linear algebra codes, the CONLAB parallel simulator, the Linda coordination language, the Seymour data parallel language, performance modeling, and workload metrics.

J. W. D.

6[65D07, 65Dxx, 41A15].—WILLARD M. SNYDER & RICHARD H. MCCUEN, *Numerical Analysis With Sliding Polynomials*, Lighthouse Publications, Mission Viejo, California, 1991, x + 561, pp., $25\frac{1}{2}$ cm. Price. $58.00.

"Sliding polynomials" are piecewise polynomial functions of a special form. The authors emphasize two types, the "four-point" and the "six-point". The former can be described as follows. An increasing set of knots x_i is given, accompanied by corresponding ordinates, y_i. On a typical interval $[x_i, x_{i+1}]$, the four-point sliding polynomial will be a cubic polynomial p determined by the four conditions $p(x_i) = y_i$, $p(x_{i+1}) = y_{i+1}$, $p'(x_i) = a$, $p'(x_{i+1}) = b$. Here a is the slope at x_i of the quadratic interpolant of the ordinates at x_{i-1}, x_i, and x_{i+1}. The value b is the slope at x_{i+1} of the quadratic that interpolates the given ordinates at x_i, x_{i+1}, and x_{i+2}. The definition leads to a composite function that is of class C^1. The six-point sliding polynomial is similar; it is a piecewise quintic polynomial and is of class C^2.

The book emphasizes the case of equally-spaced knots, and provides formulas and codes for doing various tasks with these sliding polynomials in the equally-spaced case. There are ten chapters, dealing with such topics as numerical differentiation, numerical integration, smoothing, contouring, differential equations, integral equations, and finite elements. Multidimensional sliding polynomials are needed for the latter. Each chapter contains many examples employing realistic data. Appendix A (17 pages) gives numerical constants use-