are presented for the determination of numerical weight functions.

It should be noted that two parts of the book (Chapters 1–3 and Chapters 4–6) are different. The first part is a brief survey of basics in fracture mechanics and theory of elasticity. Some paragraphs of this part may be omitted because it may not serve a purpose for the reader, owing to its meager contents. The second part provides fairly detailed information to the reader and contains recent advances in application of boundary element methods to fracture mechanics problems. A schematic of a three-dimensional crack problem is shown on the cover of the book, but there is no three-dimensional example inside of it. Nevertheless, this does not diminish the value of the book. This book should be of interest to researchers and graduate students in the field of computational fracture mechanics.

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34[65–06, 65Y05].—RICHARD F. SINCOVEC, DAVID E. KEYES, MICHAEL R. LEUZE, LINDA R. PETZOLD & DANIEL A. REED (Editors), *Proceedings of the Sixth SIAM Conference on Parallel Processing for Scientific Computing*, Vols. I and II, SIAM Proceedings Series, SIAM, Philadelphia, PA, 1993, xx+1041 pp., $25\frac{1}{2}$ cm. Price: Softcover $95.00.

This collection of 183 short papers and abstracts from the 1993 SIAM Conference on Parallel Processing for Scientific Computing is almost twice as large as the previous proceedings from the 1991 conference, representing the continued growth and interest in high-performance computing. This conference focussed on themes from the High Performance Computing and Communications (HPCC) program, and on Grand Challenge problems in particular. Progress is being driven by the availability of parallel hardware (CM-2, CM-5, Intel i860, Intel Paragon, KSR, workstation networks, etc.), software for distributed network computing, and the large number of applications scientists using parallel computers. The organizers strove to bring applications scientists and computer scientists together to discuss common problems and solutions, and the breadth of topics discussed below reflects this diverse attendance. Owing to the large number of papers, we will just outline the topics covered, rather than discuss individual papers.

The applications cover *computational fluid dynamics* (hydrodynamics, mixed aerodynamics-chemistry and aerodynamics-acoustics codes, relativistic hydrodynamics, and viscoelastic polymer flows), *geophysical modeling* (coupled atmospheric-ocean models, multiphase contaminant transport in porous media, oil refinery modeling, drought monitoring, and magnetosphere modeling), *materials science* (crystal structures, superconductor modeling, piezoelectric modeling), *molecular dynamics, electrical engineering* (electromagnetic scattering, image processing, optimizing VLSI interconnects, semiconductor modeling, circuit simulation, and Helmholtz equation) and various other applications (nuclear reactor vessel simulation, liquid crystal physics, analysis of biological oscillators, control theory, chemical topology enumerations, neural nets, the automotive industry, tissue growth simulation, x-ray crystallography, and map analysis).

Many of these applications share the same basic kinds of mathematical models: finite difference methods, spectral methods, or particle methods, which in turn lead to systems of linear equations, FFTs, and PIC algorithms. As a result, there were many independent papers on dense linear algebra (block algorithms, matrix communication libraries, parallel eigenvalue, singular value, and least squares algorithms) and sparse linear algebra (sparse matrix-vector multiply and Krylov subspace methods, reordering matrices to reduce fill during elimination, multifrontal methods, and the sparse simplex algorithm). Some of the other numerical methods addressed include domain decomposition, graph partitioning, fast Poisson solvers, constrained optimization, random number generation, interval Newton, and discrete time optimal control.

There were also a large number of papers on parallel programming tools, including load partitioners for mesh and particle methods, distributed object libraries, parallel Fortran and other parallel programming languages and constructs, tools for heterogeneous network computing, communication algorithms, load balancing, scheduling, partitioning, performance modeling, architecture and visualization.

Finally, there was a session on education, including free courseware available electronically for undergraduate courses on parallel computing.

J. W. D.

35[68–06, 68Q40].—THOMAS LEE (Editor), *Mathematical Computation with Maple* V: *Ideas and Applications*, Birkhäuser, Boston, 1993, viii+199 pp., 28 cm. Price: Softcover $34.50.

This is a proceedings of a summer 1993 workshop and symposium conducted by the Waterloo Maple Software company, vendors of the Maple V computer algebra system.

The papers are grouped according to their general topics: introduction of computer algebra systems in educational situations (calculus, engineering, physics): 6 papers; exposition on using Maple for specific tasks in applied mathematics, science, and engineering: 13 papers. Two papers on solids modeling struck this reviewer as particularly interesting.

The education papers (and their references) may be of particular use to faculty considering introducing a computer algebra system (Maple, Mathematica, or some other program) into their curriculum.

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36[01A75, 11–03].—D. MCCARTHY (Editor), *Selected Papers of D. H. Lehmer*, The Charles Babbage Research Center, Winnipeg, Canada, 1981, 3 vols., ixx+368 pp., 429 pp., 341 pp., $23\frac{1}{2}$ cm. Price $105.00 hardcover, $72.00 paperback (for the set).

The issuing of this three-volume set in 1981 has given to the mathematical world a collection of the major writings of one of the foremost computational