classify all perfect groups of order less than a million. They do not quite make it (but see summary, pp. 260–264), there being too many extensions of large 2-groups by the simple groups of order 60 and 168. However, they do an incredible amount of work, both theoretical and computational, vastly extending Sandlöbes' classification of perfect groups of order less than 10^4 [2].

This is a great book for group theorists to dip into, since it brings together all kinds of interesting theorems hidden in the literature. Someone interested, for example, in universal Frattini extensions can find a thorough discussion here. The authors' claim that the book is self-contained, however, might be questioned. They have included accelerated introductions to, e.g., modular representation theory, but for many of the theorems they still have to quote results. That said, it is great to see these theories in action. There are many examples worked out in detail, supplemented by interesting exercises for the reader.

The tables of perfect groups occupy most of the book, extending for hundreds of pages. They are similar to the Atlas [1]. They lack discussion of subgroups, but go on extensively about the cohomology of the groups. Character tables of certain perfect groups are included in a microfiche appendix by W. Hanrath. These are quotients of space groups, which are extensions of lattices by finite groups acting faithfully. One of the best ways to produce finite perfect groups was to find such quotients, and so the book contains theory and tables of perfect space groups.

All in all, an impressive book that makes some very complicated material easily readable.

NIGEL BOSTON

Department of Mathematics
University of Illinois
Urbana, Illinois 61801

1. J. H. Conway, R. T. Curtis, S. P. Norton, R. A. Parker, and R. A. Wilson, *Atlas of finite groups—Maximal subgroups and ordinary characters for simple groups*, Clarendon Press, Oxford, 1985.

2. G. Sandlöbes, *Perfect groups of order less than* 10^4, Comm. Algebra **9** (1981), 477–490.

33[65–06, 65N20, 65N30].—TONY F. CHAN, ROLAND GLOWINSKI, JACQUES PERIAUX & OLOF B. WIDLUND (Editors), *Domain Decomposition Methods for Partial Differential Equations*, Proceedings in Applied Mathematics, Vol. 43, SIAM, Philadelphia, PA, 1990, xx + 491 pp., $25\frac{1}{2}$ cm. Price: Softcover $58.50.

This book is the proceedings of the Third (annual) International Symposium on Domain Decomposition Methods for Partial Differential Equations held in Houston in March, 1989. The fourth of this series has already occurred in Moscow, and the proceedings from it will also be published by SIAM.

The rubric "domain decomposition" embraces a broad set of research interests, from the theory of partial differential equations to numerical algorithms for their solution. The book includes an excellent historical introduction which first appeared in SIAM News [1] and which describes the subject's origins in the theory of partial differential equations and subsequent development. The introduction [1] also includes some comments on the highlights of the Houston meeting, some of which (unfortunately) are not represented in the published proceedings.

It is noted in the introduction [1] that most commercial codes for solving partial differential equations utilize Gaussian elimination in one form or other. More sophisticated methods as discussed in this book obviously offer some possibility of improved efficiency for solution of the linear equations resulting from discretizing partial differential equations. However, missing from the symposium was a critical evaluation of the relative efficiency of the serious competitors for rapid solution of the linear equations resulting from discretizing partial differential equations. In addition to domain decomposition, one would also want to consider some form of multilevel iterative technique ("multigrid") and efficient node numbering schemes for Gaussian elimination (e.g., minimum degree or nested dissection) as well as possibly others. The question of computational complexity of the competing algorithms becomes even more difficult when parallel computers are to be used, as indicated by Part III of the book.

This book represents the state of the art of domain decomposition methods for partial differential equations as of March, 1989. As such it is clearly a must for anyone working in the field or related ones.

R. SCOTT

1. O. Widlund, *Domain decomposition algorithms and the bicentennial of the French Revolution*, SIAM News **22**, July/August, 1989.

34[65–06].—J. C. DÍAZ (Editor), *Mathematics for Large Scale Computing*, Lecture Notes in Pure and Appl. Math., Vol. 120, Dekker, New York and Basel, 1989, xi + 345 pp., 25 cm. Price $85.00.

This book is based on the proceedings of a regional meeting of the American Mathematical Society held in Denton, Texas in 1986. However, it was not published until 1989 due to a lengthy refereeing process. The focus of the book is quite broad, although no more so than the title suggests. It contains both survey articles and original research papers. The principal unifying aspect of the book is the regional location of many of the authors.

The book represents well the breadth of subjects integral to scientific computing. If the individual papers that make up the book had been published in journals, they would have been dispersed among several having distinct objectives. Thus the book can serve as a good indicator of the variety of topics of current research in scientific computing for someone new to the field.