Chapter 4 is on inequalities involving trigonometric sums. Classical work by many persons is presented in a section of 33 pages. Another section of 40 pages emphasizes positivity results, mostly of recent origin.

Chapter 5 concerns extremum problems, particularly minimum norm problems. Incomplete polynomials receive the attention of one section, and inequalities involving trigonometric polynomials with different norms (inequalities of the Nikolskii type) are the subject of another section.

Chapter 6, having 200 pages, is on the extremal problems exemplified by the Markoff and Bernstein inequalities. The inequalities are given for various domains, various norms and for various subclasses of polynomials, both algebraic and trigonometric.

Chapter 7 sets forth some interesting applications: least squares approximation with constraints, simultaneous approximation, the Bernstein conjecture, and computer-aided design.

The book is written in a gentle style: one can open it anywhere and begin to understand, without encountering unfamiliar notation and terminology. It is strongly recommended to individuals and to libraries.

E.W.C.

11[49-02, 49J10, 65K10]—*Optimization and nonstandard analysis*, by J. E. Rubio, Monographs and Textbooks in Pure and Applied Mathematics, Vol. 184, Dekker, New York, 1994, xii + 356 pp., $23\frac{1}{2}$ cm, $135.00

Nonstandard analysis not only provides powerful tools for simplifying standard proofs and for proving or refuting new conjectures; it also gives precise meaning to many informal and intuitive notions. For example, in nonstandard analysis, each real-valued objective function with a lower bound has near-minimizers, even if—like the exponential function $x \mapsto e^x$ whose near-minimizers are large and negative—it has no minimizer. These near-minimizers provide a theoretical counterpart to the approximations to minimizers obtained by optimization algorithms in finitely many iterations.

While Rubio introduces near-minimizers on page 15 of his text, more than a hundred pages pass before they are mentioned again. In the interim, Rubio succinctly summarizes a considerable part of set theory, topology, model theory, and measure theory, both standard and nonstandard. He has organized this text into six chapters:

1. Optimization and Nonstandard Analysis, with a now typical ultrapower approach to nonstandard analysis and a proof of the transfer theorem;
2. Further Concepts and Applications, defining internal sets, enlargements of superstructures, and saturation;
3. Measure Theory and Infinite-Dimensional Linear Programming, presenting the theory of Loeb measure and a nonstandard characterization of realcompact spaces;
4. Linear Spaces, A Variational Principle and Penalties, with applications to optimal control and simple variational problems;
5. The Control of Homogenized Systems, deriving the homogenized nonlinear diffusion equation; and
6. Distributions, using certain optimal control problems to illustrate the nonstandard theory.

In addition to the notes and references at the end of each chapter, Rubio provides exercises for each chapter in one appendix, and an 85-page bibliography in another.

Students can test their understanding of this material not only by working through the suggested exercises but also by correcting quite frequent typographical errors; e.g., replacing "$\subseteq$" by "$\supseteq$" near the bottom of page 18, "$\bigcup_{i\in\mathbb{N}}$" by "$\bigcup_{n\in\mathbb{N}}$" in Eq. 1.25, and "$\exists x\psi$" by "$\exists z\psi$" in Definition 1.7d.

Much of this book develops sophisticated mathematical concepts needed for advanced applications of nonstandard analysis, rather than concentrating on just the more familiar concepts needed for certain simpler applications. For example, properties of κ-saturated superstructures are developed for arbitrary infinite cardinals κ, before discussing the embedding of the ordered field $\mathbb{R}$ of reals into the ordered field $^*\mathbb{R}$ of hyperreals. Consequently, this book is more for the mathematician seeking powerful new ways to study advanced optimization theory, rather than for the numerical analyst with only a casual interest in nonstandard analysis.

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12[65-06, 65Y05]—*Parallel processing for scientific computing*, David H. Bailey, Petter E. Bjørstad, John R. Gilbert, Michael V. Mascagni, Robert S. Schreiber, Horst D. Simon, Virginia J. Torczon, and Layne T. Watson (Editors), SIAM Proceedings Series, Society for Industrial and Applied Mathematics, Philadelphia, PA, 1995, xviii + 875 pp., $25\frac{1}{2}$ cm, softcover, $105.00

These are the proceedings of the Seventh SIAM Conference on the topic of the title, held February 15–17, 1995, in San Francisco. Included are minisymposia papers, contributed papers, and short summaries of poster presentations. The nearly 200 papers, organized in three parts, each further subdivided into four chapters, give an impressive account of the current use of parallelism in a vast variety of application areas. Specifically, Part I entitled "Applications", contains chapters on image, signal, and information processing; optimization and control; computational physics; and mathematical applications. Part II, entitled "Algorithms", has chapters on n-body simulation; partial differential equations; sparse linear systems; and eigenvalues. Part III, entitled "Systems", finally concludes with chapters on mesh partitioning and load balancing; languages and compliers; libraries and runtime systems; and visualization and performance. There is a final chapter containing position papers from a Panel Discussion on the question "Is scalable parallel computing a myth?". An author index concludes the volume.

W. G.

13[11-01, 11Yxx]—*A course in computational algebraic number theory*, by Henri Cohen, Graduate Texts in Mathematics, Vol. 138, Springer, Berlin, 1993, xxii + 534 pp., 24 cm, $49.00

The present book is one of the most popular texts on computational number theory. Its attitude is *practical.* For instance, in the first chapter, among some gen-