

## Telegraphic Reviews



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## TELEGRAPHIC REVIEWS

Edited by Lynn Arthur Steen, with the assistance of the Mathematics Departments of Carleton, Macalester, and St. Olaf Colleges. Books and software submitted for review should be sent to Reviews Editor, American Mathematical Monthly, St. Olaf College, Northfield, Minnesota 55057.

Telegraphic Reviews are designed to alert readers in a timely manner to new books and computer software appropriate to mathematics teaching and research. Special codes classify reviews by subject area and appropriate use:

T: Textbook	P: Professional Reading	1-4: Semesters
C: Computer Software	L: Undergraduate Library	**: Special Emphasis
S: Supplementary Reading	13: Grade Level	?: Questionable

Readers are advised that price information is subject to change, that computer software is often available also on other machines, and that hardware variations often cause software incompatibilities. Selected books and software packages receive a second, more extensive review in the MONTHLY.

**General, S\*\*, L\*.** *International Mathematical Olympiads, 1978-1985 and Forty Supplementary Problems.* Murray S. Klamkin. New Math. Lib., V. 31. MAA, 1986, xii + 141 pp, (P). [ISBN: 0-88386-631-X] A sequel to NML Volume 27, giving 42 problems from seven recent Olympiads 1978-85 supplemented by 40 other problems that were submitted to but not chosen for the Olympiads. Solutions were rewritten and expanded by Klamkin, a former coach of the U.S. team. Excellent references; glossary of uncommon terms; scoring records of all IMO's. LAS

**General, S(16-17), P.** *Einführung in die klassische Mathematik I.* Helmut Koch. Springer-Verlag, 1986, 326 pp, DM68. [ISBN: 0-387-16665-3] First part of an unusual and interesting two-volume work on the mathematics of the nineteenth and early twentieth centuries. Thirty largely unrelated chapters, presenting many different results in modern language but in the spirit of their origins. JD-B

**General, P, L?** *Discrete Thoughts: Essays on Mathematics, Science, and Philosophy.* Mark Kac, Gian-Carlo Rota, Jacob T. Schwartz. Birkhauser Boston, 1986, xii + 264 pp, \$65. [ISBN: 0-8176-3285-9] A very miscellaneous collection of old writings (all reprints) on the nature of mathematics and its relation with philosophy, science, and computing. Some are essays; others book reviews. Extraordinary price of \$.25 per page for straight text. LAS

**General, S\*, L.** *Symmetry Through the Eyes of a Chemist.* István and Magdolna Hargittai. VCH (Suite 909, 220 E. 23 St., NY 10010), 1986, xii + 458 pp, \$95. [ISBN: 0-89573-520-2] This beautiful book, along the lines of Weyl's classic *Symmetry*,

looks at symmetry as a unifying theme in the nature of things (especially in chemistry). Richly illustrated with photographs, drawings, and figures. Accessible descriptions accompany the examples of symmetry in molecular geometry, molecular vibrations, electronic structure, groups, and crystals. LCL

**General, S(13-15), L.** *Measures in Science and Engineering: Their Expression, Relation and Interpretation.* B.S. Massey. Math. & Its Applic. Halsted Pr, 1986, 216 pp, \$41.95. [ISBN: 0-470-20331-5] An examination of the various units used to measure physical quantities, with related discussions concerning precision of results, dimensional analysis, and tables of conversion factors and dimensionless parameters. LCL

**Precalculus, T(13: 1).** *Precalculus: Functions and Graphs, Fifth Edition.* Earl W. Swokowski. Prindle, Weber & Schmidt, 1987, ix + 581 pp. [ISBN: 0-87150-060-4] This *Fifth Edition* puts more emphasis on graphs and geometric interpretations and on the use of calculators instead of tables. The order is now more flexible, with a larger variety of applied problems in more disciplines. The section on trigonometry is expanded for more clarity. GF

**Precalculus, T(13).** *College Algebra.* Jerome E. Kaufmann. Prindle, Weber & Schmidt, 1987, xiv + 526 pp. [ISBN: 0-87150-109-0] Covers standard material required for calculus, finite math, and business courses. Major themes are solving equations and inequalities; solving problems (emphasized throughout); developing graphing techniques; and the concept of a function. Familiarizes the student with graphing before encountering the definition of a func-

tion. Plenty of examples and problems. Chapter summaries appear especially useful. Very student-oriented text. MR

**Precalculus, T(13: 1, 2).** *College Algebra and Trigonometry*. Jerome E. Kaufmann. Prindle, Weber & Schmidt, 1987, xiv + 688 pp. [ISBN: 0-87150-014-0] Text for college students written to serve as a prerequisite for the standard calculus sequence. Covers basic algebra, solution of linear and quadratic equations, inequalities and absolute values, graphing, functions, exponentials and logarithms, trigonometry of right triangles and the unit circle, systems of equations, matrices, and conic sections. There is an extensive set of problems with answers to odd exercises. Also includes sets of special problems which may be used as supplementary material. AM

**Precalculus, T(13).** *College Algebra, Second Edition*. Max A. Sobel, Norbert Lerner. Prentice-Hall, 1987, xvi + 621 pp. [ISBN: 0-13-141839-4] Text with exercises and examples emphasizing skills needed in calculus (inequalities, simplifying expressions common in differentiating, etc.). Also includes chapters on matrices and determinants, sequences and series, and elementary combinatorics. Lots of problems and chapter tests. Cautionary notes in main body and margin of text give *incorrect* ways to perform certain calculations. (*First Edition*, TR, June-July 1983.) LC

**Finite Mathematics, T(13-14: 1).** *Applied Finite Mathematics, Second Edition*. S.T. Tan. Prindle, Weber & Schmidt, 1987, xiv + 668 pp. [ISBN: 0-87150-074-4] Quantitative techniques for students in managerial, social, and life sciences. Covers systems of equations, linear programming, mathematics of finance, probability and some statistics, Markov chains, games, and logic. Filled with worked-out examples, nice exercises, a wealth of applications. (*First Edition*, TR, June-July 1983.) RM

**Finite Mathematics, T(13: 2).** *Mathematics with Applications in the Management, Natural, and Social Sciences, Fourth Edition*. Margaret L. Lial, Charles D. Miller. Scott Foresman, 1987, 740 pp, \$23.16. [ISBN: 0-673-18464-1] Aimed at undergraduate non-science students who want to see the usual collection of finite mathematics topics and a short calculus course collected in one book. (*First Edition*, TR, November 1974; *Extended Review*, June-July, 1975; *Second Edition*, TR, April 1979; *Third Edition*, TR, August-September 1983.) AWR

**Education, L.** *Teaching Thinking Skills: Theory and Practice*. Ed: Joan Boykoff Baron, Robert J. Sternberg. WH Freeman, 1986, xi + 275 pp, \$13.95 (P). [ISBN: 0-7167-1791-3] A collection of 12 essays on the theory of teaching and evaluation of thinking skills. Although these essays do not focus on math-

ematics alone, they are of value to any teacher of college mathematics. SG

**History, S, P, L.** *Native American Mathematics*. Ed: Michael P. Closs. U of Texas Pr, 1986, 431 pp, \$35. [ISBN: 0-292-75537-1] An innovative multidisciplinary exploration of the number systems (primarily), notation, calendars, and geometry of New World natives: Innit, Ojibway, Incas, Mayans, Aztecs, and Amazon Indians. A blend of archeology, linguistics, anthropology, and mathematics. LAS

**History, S(14-16), P, L\*\*.** *Episodes in the Mathematics of Medieval Islam*. J.L. Berggren. Springer-Verlag, 1986, xiv + 197 pp, \$23. [ISBN: 0-387-96318-9] A sample of Islamic source documents dealing primarily with high school mathematics—algebra, geometry, trigonometry—tied together with rich commentary on the historical and Islamic context of these ideas. Contains algorithms for finding fifth roots of 15 digit numbers; Islamic inheritance word problems involving fractional distributions; proofs for trigonometric identities; and enough spherical trigonometry to find the direction of Mecca. A valuable resource for historians and teachers of school mathematics. LAS

**History, P, L\*.** *Hermann Weyl 1885-1985*. Ed: K. Chandrasekharan. Springer-Verlag, 1986, 119 pp, \$30. [ISBN: 0-387-16843-5] Three centenary lectures on Weyl's contributions to physics (by C.N. Yang), to geometry (by Roger Penrose), and to Lie groups (by Armand Borel), together with Weyl family photographs and other details of a celebration at the Swiss Federal Institute of Technology (ETH) on the anniversary of Weyl's birth. LAS

**History, P.** *Le Calcul Simplifié: Graphical and Mechanical Methods for Simplifying Calculation*. Maurice d'Ocagne. Transl: J. Howlett, M.R. Williams. MIT Pr, 1986, x + 167 pp, \$35. [ISBN: 0-262-15032-8] First English translation of an important although obscurely written treatise on nomography—graphical versions of slide rules constructed for special calculations. Originally written in the 1890's, this volume is a translation of the 1928 third edition. Eleventh volume in the Charles Babbage Institute Reprint Series for the History of Computing. LAS

**Logic, P.** *Predicative Arithmetic*. Edward Nelson. Math. Notes, V. 32. Princeton U Pr, 1986, viii + 189 pp, \$21 (P). [ISBN: 0-691-08455-6] From page 80: "The infant counts on its fingers, the mathematician counts on  $\omega$ —but the infant at least knows its fingers to exist." Predicative arithmetic removes the induction principle and looks at how much theory of numbers remains. (An "impassable barrier" is reached midway through!) BC

**Logic, T(18), S, P.** *A Manual of Intensional Logic*. Johan van Benthem. CSLI Lect. Notes, No. 1. CSLI (Ventura Hall, Stanford U., Stanford, CA 94305),

1985, 74 pp, \$8.95 (P). A survey of intensional logic as a general research program, whose core idea is that intensional notions may be modelled by families of ordinary extensional models from standard logic, spread out over suitable points in time, possible worlds, etc. ("multiple reference" strategy). LCL

**Foundations, P, L.** *Foundations of Space-Time Theories: Relativistic Physics and Philosophy of Science.* Michael Friedman. Princeton U Pr, 1983, xvi + 385 pp, \$14.50 (P). [ISBN: 0-691-02039-6] A philosophical treatise (with an appendix on differential geometry) aimed at resolving incompatible conceptions of the role of geometry in physics: the physicalization of geometry in which its features become as empirical as, say, an election, or the idealization of geometry in which it is merely a pattern imposed on nature by human intelligence. (The author is a professor of philosophy at the University of Illinois at Chicago—not the homonymous Fields medalist mathematician who works in the same area.) LAS

**Foundations, P.** *Filters and Ultrafilters Over Definite Subsets of Admissible Ordinals.* J.C.M. Baeten. CWI Tract, No. 24. Math Centrum, 1986, 77 pp, Dfl. 12.50 (P). [ISBN: 90-6196-301-X] A study of recursive analogues of measurable cardinals. LCL

**Foundations, S(15-17), P, L.** *New Directions in the Philosophy of Mathematics: An Anthology.* Ed: Thomas Tymoczko. Birkhauser Boston, 1986, xvii + 323 pp, \$57.50. [ISBN: 0-8176-3163-1] A compelling collection of reprints, each with a careful introduction, on recent challenges to the traditional philosophies of mathematics and on current practice that may illuminate a new direction. Authors Reuben Hersh, Imre Lakatos, Philip Kitcher, Philip Davis, et al., emphasize the empirical, exploratory, fallible roots of mathematical practice. An excellent resource for a stimulating undergraduate seminar. LAS

**Combinatorics, T(17: 1), P.** *Combinatorics: Set Systems, Hypergraphs, Families of Vectors and Combinatorial Probability.* Béla Bollobás. Cambridge U Pr, 1986, xii + 177 pp, \$39.50; \$13.95 (P). [ISBN: 0-521-33059-9; 0-521-33703-8] Thorough grounding in set systems and hypergraphs. Chapter headings include representing sets, Sperner systems, random sets, Helly families, and partitioning sets of vectors. Over a hundred exercises. References included. LC

**Number Theory, T\*(17-18: 1, 2), S, P\*, L\*.** *Elliptic Curves.* Dale Husemoller. Grad. Texts in Math., V. 111. Springer-Verlag, 1986, xv + 350 pp, \$48. [ISBN: 0-387-96371-5] Another fine introduction to the hottest topic in number theory. (If you haven't heard, Fermat's Last Theorem is now known to follow from the Weil-Taniyama conjecture on elliptic curves.) Combines algebraic and analytic approaches. The first few chapters are accessible

to undergraduates. Lots of exercises—includes solutions. BC

**Number Theory, P.** *Lecture Notes in Mathematics-1231: Drinfeld Modular Curves.* Ernst-Ulrich Gekeler. Springer-Verlag, 1986, xiv + 107 pp, \$12.80 (P). [ISBN: 0-387-17201-7] An introduction to the theory of modular forms in characteristic  $p$ . The author includes a summary of needed background material based on the work of Drinfeld, Hayes, and Gass as well as a presentation of some of his own recent results. This work underscores the deep and beautiful analogy between the field of rational numbers and the field of algebraic functions in one variable over a finite field. SG

**Number Theory, P?** *1012 Problems.* A.S. Moiseenko (10-12 Kimball St., Belleville, NJ), 1986, 585 pp, (P). A collection of 1012 Diophantine equations, almost all of which are solved. CEC

**Number Theory, S(18), P.** *Diophantine Analysis.* Ed: J.H. Loxton, A.J. van der Poorten. London Math. Soc. Lect. Note Ser., V. 109. Cambridge U Pr, 1986, 170 pp, \$19.95 (P). [ISBN: 0-521-33923-5] A collection of nine number theory papers which were presented at the Third Australasian Mathematics Convention which was held at the University of New South Wales from May 13-17, 1985. A particularly distinguished group of number theorists give an overview of the field of Diophantine analysis and a guide to problems of current interest. CEC

**Linear Algebra, T(17-18: 2), S, P.** *Matrizentheorie.* Felix R. Gantmacher. Springer-Verlag, 1986, 654 pp, DM138. [ISBN: 0-387-16582-7] German translation of *Second Edition* of a comprehensive Russian text on matrices and their applications. JD-B

**Linear Algebra, T\*(17: 1), S, P, L.** *Invariant Subspaces of Matrices with Applications.* I. Gohberg, P. Lancaster, L. Rodman. Canadian Math. Soc. Ser. of Mono. & Adv. Texts. Wiley, 1986, xv + 692 pp, \$59.95. [ISBN: 0-471-84260-5] An advanced linear algebra book in which invariant subspaces of matrices are the central notion and the main tool. Contains a comprehensive treatment of geometrical, algebraic, topological, and analytic properties of invariant subspaces. Begins with work suitable for advanced undergraduates and moves into recent achievements which have not appeared before in books. Includes exercises and a list of references. CEC

**Linear Algebra, T(14: 1).** *Elementary Linear Algebra, Alternate Second Edition.* Stewart Venit, Wayne Bishop. Prindle, Weber & Schmidt, 1987, xiii + 415 pp. [ISBN: 0-87150-094-9] Contains the same material as *Second Edition* but the first chapter, geometry of  $R^n$ , has become chapter 3 in this version (following chapters on linear equations and matrices,

and determinants). (*First Edition*, TR, April 1981.) JNC

**Topological Groups, P. Harmonic Analysis on the Heisenberg Nilpotent Lie Group, With Applications to Signal Theory.** W. Schempp. Res. Notes in Math. Ser., V. 147. Longman Scientific & Technical (US Distr: Wiley), 1986, 199 pp, \$39.95 (P). [ISBN: 0-470-20374-9] The Heisenberg group is a non-commutative, non-compact Lie group whose Lie algebra is defined by the canonical commutation relations from quantum mechanics. The goal of this book is to study the harmonic analysis of the Heisenberg group, i.e., its unitary linear representations. Includes applications in the theory of analog and digital signals. AM

**Topological Groups, P. Group Representations, Ergodic Theory, Operator Algebras, and Mathematical Physics.** Ed: C.C. Moore. Math. Sci. Res. Inst. Pub., V. 6. Springer-Verlag, 1987, ix + 278 pp, \$27. [ISBN: 0-387-96471-1] Ten papers from a conference in honor of George Mackey (who has made profound contributions to each subject listed in the title) held at MSRI, Berkeley, in 1984. Includes excellent expository lectures on dual vector spaces by Irving Kaplansky, and on mathematical physics by Irving Segal. BC

**Algebra, T(15-16: 1, 2), L. Modern Abstract Algebra.** David C. Buchthal, Douglas E. Cameron. Prindle, Weber & Schmidt, 1987, xii + 548 pp. [ISBN: 0-87150-057-4] After preliminaries on mathematical proof and abstract mappings, the presentation is a fairly straightforward look at the standard topics of groups, rings, and fields. More unusual topics included are chapters on group codes, polynomial codes, and lattices. Exercises (some answers and solutions), references, index. JS

**Algebra, P. Representation Theory of Infinite Groups and Finite Quasigroups.** Jonathan D.H. Smith. Pr U Montreal, 1986, 132 pp, \$18 (P). [ISBN: 2-7606-0776-3] The purpose of these notes is to initiate a study of the representation theory of finite quasigroups. One of the main theses is that the representation theory of a finite quasigroup is equivalent to the representation theory of certain infinite groups, the universal multiplication groups of the quasigroup. A consequence of this is that the study of a finite Latin square (classical finite combinatorics) may be related to the representation theory of free groups (infinite group theory). LCL

**Algebra, T(14-16: 1, 2), S, L. Essential Student Algebra.** T.S. Blyth, E.F. Robertson. Chapman & Hall, 1986, (P). V. 1: *Sets and Mappings*, 120 pp, [ISBN: 0-412-27880-4]; V. 2: *Matrices and Vector Spaces*, 120 pp, [ISBN: 0-412-27870-7]; V. 3: *Abstract Algebra*, 120 pp, [ISBN: 0-412-27860-X]; V. 4: *Linear Algebra*, 120 pp, [ISBN: 0-412-27850-2]; V.

5: *Groups*, 120 pp. [ISBN: 0-412-27840-5] Compact, concise, modular units, moving through the basics to the fundamentals of the following topics: (1) equivalence relations, permutations, cardinal numbers, (2) eigenvalues and eigenvectors, (3) groups, rings, fields, quotient structures, (4) Jordan forms, bilinear and quadratic forms, (5) Sylow theorems, composition series. LCL

**Algebra, T(15-16). Undergraduate Algebra.** Serge Lang. Undergrad. Texts in Math. Springer-Verlag, 1987, ix + 256 pp, \$36. [ISBN: 0-387-96404-5] The first five chapters cover the integers, groups, rings, polynomials, vector spaces and modules. The remaining five chapters focus on linear groups, Galois theory, finite fields, the real and complex number systems, and set theory. The emphasis is on breadth rather than depth although the treatment is somewhat more sophisticated than that of many other algebra texts. SG

**Calculus, T(13-14: 2). Introductory Mathematical Analysis for Business, Economics, and the Life and Social Sciences, Fifth Edition.** Ernest F. Haeussler, Jr., Richard S. Paul. Prentice-Hall, 1987, xiii + 815 pp. [ISBN: 0-13-501941-9] Expanded to include applications in biology, sociology, psychology, ecology, statistics and archeology. No prior knowledge of applications areas assumed. Algebra, probability, matrix algebra, linear programming, functions and both single- and multi-variable calculus. Interesting examples and exercises. (*First Edition*, TR, May 1974; *Second Edition*, TR, December 1976; *Third Edition*, TR, December 1980; *Fourth Edition*, TR, August-September 1983.) JK

**Calculus, T(13: 2). Calculus and Its Applications, Fourth Edition.** Larry J. Goldstein, David C. Lay, David I. Schneider. Prentice-Hall, 1987, xix + 682 pp. [ISBN: 0-13-111030-6] An intuitive presentation illustrated with numerous applications to biological, social, and management sciences. Changes in this edition include additional examples and exercises, an alteration in the definition of the definite integral, some revisions in the chapter on differentiation, new material on Taylor polynomials and infinite series. (*First Edition*, TR, February 1977; *Second Edition*, TR, December 1980; *Third Edition*, TR, April 1984.) JNC

**Calculus, T(13: 1, 2). Applied Calculus.** Soo Tang Tan. Prindle, Weber & Schmidt, 1986, ix + 662 pp. [ISBN: 0-87150-954-7] An intuitive introduction to the basics of elementary differential and integral calculus, mainly of algebraic, logarithmic, and exponential functions. Trigonometric functions are handled only briefly. Not rigorous—e.g., no mean value theorem. Economics and life-science examples predominate over physical examples. Elementary numerical methods (integration, equation-solving, differen-

tial equations) are covered. PZ

**Real Analysis, P.** *Lecture Notes in Mathematics-1189: Fine Topology Methods in Real Analysis and Potential Theory.* Jaroslav Lukeš, Jan Malý, Luděk Zajíček. Springer-Verlag, 1986, x + 472 pp, \$40.20 (P). [ISBN: 0-387-16474-X] In 1940, H. Cartan defined the *fine topology* as the coarsest topology on  $R^n$  making all superharmonic functions continuous. Text develops general properties of this topology and details its uses in potential theory. Numerous historical notes and references, as well as an extensive bibliography. BH

**Real Analysis, P.** *Recent Progress in Fourier Analysis.* Ed: I. Peral, J.-L. Rubio de Francia. Math. Stud., V. 111. Elsevier Science, 1985, v + 268 pp, \$37 (P). [ISBN: 0-444-87745-2] Proceedings of the seminar on Fourier analysis held in El Escorial, Spain, June 30-July 5, 1983. BH

**Complex Analysis, P.** *Contributions to Several Complex Variables: In Honor of Wilhelm Stoll.* Ed: Alan Howard, Pit-Mann Wong. Aspects of Math., V. E9. Friedr Viewig & Sohn, 1986, xi + 353 pp, (P). [ISBN: 3-528-08964-4] 18 papers on many topics in several complex variables constitute the proceedings of a conference in honor of Wilhelm Stoll, held in 1984 at the University of Notre Dame. PZ

**Complex Analysis, T(18: 1, 2), S, P.** *Univalent Functions and Teichmüller Spaces.* Olli Lehto. Grad. Texts in Math., V. 109. Springer-Verlag, 1986, xii + 257 pp, \$46. [ISBN: 0-387-96310-3] From the introduction: "The interplay between the theory of univalent functions and the theory of Teichmüller spaces is the main theme... ." Assuming graduate-level complex analysis, this monograph begins with basics of quasiconformal mappings and univalent function theory. Later chapters treat Teichmüller spaces and Riemann surfaces, culminating with Teichmüller spaces of Riemann surfaces. With chapter summaries; no exercises. PZ

**Complex Analysis, S(18), P.** *Darstellung und Begründung einiger neuerer Ergebnisse der Funktionentheorie.* Edmund Landau, Dieter Gaier. Springer-Verlag, 1986, xi + 201 pp, DM96. [ISBN: 0-387-16886-9] Text of *Second Edition* of Landau's classic book, with two appendices by Gaier. The first contains brief comments on most sections of Landau and on more recent related results. The second covers in some detail several further "pearls of function theory." Extensive bibliography, no index. JD-B

**Differential Equations, T(16-17: 2), S.** *Gewöhnliche Differentialgleichungen: Eine Einführung in Theorie und Praxis.* Helmut Werner, Herbert Arndt. Hochschultext. Springer-Verlag, 1986, x + 335 pp, DM38 (P). [ISBN: 0-387-15288-1] An introductory but sophisticated text. Treats existence and unique-

ness theorems as well as numerical methods. Chapter on stiff equations. No exercises. JD-B

**Differential Equations, T(16-17: 1, 2), S\*, P, L\*.** *Nonlinear Stochastic Operator Equations.* George Adomian. Academic Pr, 1986, xv + 287 pp, \$64.50. [ISBN: 0-12-044375-9] From the Preface: "This book addresses the need for realistic solutions of the nonlinear stochastic equations arising in the modeling of frontier problems in every area of science... . Thus the solution sought is that of the problem at hand, rather than one tailored to machine computation or the use of existing theorems of mathematics." A worthy endeavor, well embarked on! BC

**Differential Equations, T(10-17: 2, 3).** *Applied Analysis.* Allan M. Krall. Math. & Its Applic. D Reidel, 1986, xi + 561 pp, \$89.50. [ISBN: 90-277-2328-1] Textbook on applied mathematics from the mathematician's viewpoint—i.e., applications secondary. Covers linear spaces and linear operators, linear ordinary differential equations, and the Sturm-Liouville problem. Also includes an introduction to partial differential equations, using a distributional setting to discuss the Laplace equation, the heat equation, and the wave equation. Examples and exercises included. LC

**Differential Equations, T(14).** *The Solution of Ordinary Differential Equations.* E.L. Ince, I.N. Sneddon. Math. Texts. Longman Scientific & Technical (US Distr: Wiley), 1987, x + 234 pp, \$24.95 (P). [ISBN: 0-470-20680-2] Just a little addition here and there by Sneddon to update the immensely popular (*Seventh Edition*) compact differential equations book by Ince. Still attractive and effective. AWR

**Differential Equations, P\*.** *Wave Interactions and Fluid Flows.* Alex D.D. Craik. Mono. on Mech. & Appl. Math. Cambridge U Pr, 1985, xii + 322 pp, \$59.50. [ISBN: 0-521-26740-4] Comprehensive account of current theory and experiment. Focuses on nonlinear wave interactions in incompressible fluids. Includes wave-driven mean flows, multi-wave resonance, conservative and dissipative cases, and a discussion of numerical methods. MR

**Differential Equations, P.** *Lecture Notes in Mathematics-1223: Differential Equations in Banach Spaces.* Ed: A. Favini, E. Obrecht. Springer-Verlag, 1986, viii + 299 pp, \$27.80 (P). [ISBN: 0-387-17191-6] Proceedings of a July 1985 conference held at the University of Bologna. LAS

**Differential Equations, T\*\*(14-15: 1, 2), L.** *Introduction to Differential Equations.* Richard K. Miller. Prentice-Hall, 1987, x + 628 pp. [ISBN: 0-13-481003-1] Very readable and carefully written. A multitude of problems, carefully chosen, of varying degrees of difficulty. Traditional and nonstandard

applications. Reviews complex numbers, infinite series, linear algebra. Concludes with chapters on numerical analysis (computer-oriented, and suitable for self-study), qualitative analysis, Fourier series, separation of variables in partial differential equations. A very nice book. DFA

**Differential Equations, P. Asymptotics of High Order Differential Equations.** R.B. Paris, A.D. Wood. Res. Notes in Math. Ser., V. 129. Longman Scientific & Technical (US Distr: Wiley), 1986, 344 pp, \$49.95 (P). [ISBN: 0-470-20375-7] Develops asymptotic solutions about an irregular singular point at infinity for differential equations with coefficients that are powers of or polynomials in  $z$ . Methods employed are classical and require familiarity with complex function theory and hypergeometric functions. Many examples and applications to physics and spectral theory. MR

**Differential Equations, T(17-18), P, L. Solving Ordinary Differential Equations I: Nonstiff Problems.** E. Hairer, S.P. Nørsett, G. Wanner. Ser. in Comput. Math., V. 8. Springer-Verlag, 1987, xiii + 480 pp, \$69. [ISBN: 0-387-17145-2] Three chapters on classical mathematical theory; Runge-Kutta and extrapolation methods; multistep and general linear methods. Applications from physics, chemistry, biology, astronomy. Appendix contains Fortran codes. Engagingly written, with historical development and remarks throughout. Exercises. Over 350 bibliographic citations. DFA

**Differential Equations, P. Lecture Notes in Mathematics-1192: Equadiff 6.** Ed: J. Vosmanský, M. Zlámal. Springer-Verlag, 1986, xx + 424 pp, \$36.10 (P). [ISBN: 0-387-16469-3] Proceedings of an international conference on differential equations and their applications held in Brno, Czechoslovakia in August, 1985. Nine of the ten plenary lectures, plus sectional papers on ordinary differential equations, partial differential equations, numerical methods and applications. LAS

**Differential Equations, P. Lecture Notes in Mathematics-1191: The Isomonodromic Deformation Method in the Theory of Painlevé Equations.** Alexander R. Its, Victor Yu. Novokshenov. Springer-Verlag, 1986, iv + 313 pp, \$25 (P). [ISBN: 0-387-16483-9]

**Differential Equations, T(16-17), S. Stability of Functional Differential Equations.** V.B. Kolmanovskii, V.R. Nosov. Math. in Sci. & Eng., V. 180. Academic Pr, 1986, xiv + 217 pp, \$29.95 (P); \$50. [ISBN: 0-12-417941-X; 0-12-417940-1] A functional differential equation involves a function  $g(t)$  of one scalar argument  $t$  and its derivatives for several values (translations) of  $t$ . They occur in problems involving time lag, delay, etc. Authors discuss retarded equations, neutral, and stochastic functional

differential equations. Calculus is the only prerequisite. Attractively printed. AWR

**Partial Differential Equations, T(17-18). Partial Differential Equations, Second Edition.** P.R. Garabedian. Chelsea, 1986, xii + 672 pp, \$27.50. [ISBN: 0-8284-00325-2] A reprint of the *First Edition* originally published in 1964. Assumes a knowledge of separation of variables and Fourier series. Written for scientists and engineers as well as for mathematicians, this text includes the method of characteristics, Hamilton-Jacobi theory, the Cauchy problem, Dirichlet's principle, integral equations, and fluid dynamics. AM

**Partial Differential Equations, P. Advances in Microlocal Analysis.** Ed: H.G. Garnir. NATO ASI Ser. C, V. 168. D Reidel, 1985, xvii + 390 pp, \$69. [ISBN: 90-277-2195-5] Collection of 15 lectures given at the 1985 Castelvechio-Pascoli NATO Advanced Study Institute, September 2-12, 1985. These lectures cover applications of microlocal analysis to solutions of linear partial differential equations, and also cover recent work using microlocal analysis in non-linear partial differential equations. AM

**Partial Differential Equations, S(16-17). Analysis of a Finite Element Method: PDE/PROTRAN.** Granville Sewell. Springer-Verlag, 1985, x + 154 pp, \$24. [ISBN: 0-387-96226-3] Use of a finite element package to solve partial differential equations in 2-dimensions. Methods for elliptic, hyperbolic, parabolic, and eigenvalue problems. RWN

**Partial Differential Equations, P. Solitons in Mathematics and Physics.** Alan C. Newell. SIAM, 1985, xvi + 244 pp, \$29.50. [ISBN: 0-89871-196-7] Solitons were first observed as coherent solitary waves propagating through canals in England. They arise as local, traveling pulse solutions to non-linear wave equations. This book describes solitons as they appear in mathematics and physics. Includes the KDV equation, non-linear Schroedinger equation, and the completely integrable structure of these equations. AM

**Partial Differential Equations, P. Wave Propagation: An Invariant Imbedding Approach.** Richard Bellman, Ramabhadra Vasudevan. Math. & Its Applic. D Reidel, 1986, xiv + 367 pp, \$54.50. [ISBN: 90-277-1766-4] Invariant imbedding is the idea that it is often useful to study a problem, not in isolation, but as a member of a family of similar problems depending on an additional parameter. Explains basic principles of imbedding concepts and their application to obtaining solutions for wave equations propagating in homogeneous media. AM

**Partial Differential Equations, P. Lecture Notes in Mathematics-1054: Galerkin Finite Element Methods for Parabolic Problems.** Vidar Thomée. Springer-Verlag, 1984, vii + 237 pp, \$11 (P). [ISBN:

0-387-12911-1] Summary of recent results and theoretical background for applying Galerkin-like finite element methods to a variety of problems including inhomogeneous, discontinuous, nonlinear, mixed and singular problems. RWN

**Partial Differential Equations, P. *Lecture Notes in Mathematics-985: Asymptotic Analysis II—Surveys and New Trends***. Ed: F. Verhulst. Springer-Verlag, 1983, 497 pp, \$26.50 (P). [ISBN: 0-387-12286-9] A collection of 19 survey and research papers on asymptotic and perturbation methods and their applications. RWN

**Partial Differential Equations, P. *On the Cauchy Problem***. Sigeru Mizohata. Notes & Rep. in Math. in Sci. & Eng., V. 3. Academic Pr, 1985, 177 pp, \$36 (P). [ISBN: 0-12-501660-3] Rather stilted English translation of series of lectures given by the author at Wuhan University, China. Topics include Lax-Mizohata theorem, Cauchy problems in the Gevrey class, and micro-local analysis in the Gevrey class. Numerous references at end of each chapter. Assumes basic knowledge of pseudo-differential operators. BH

**Partial Differential Equations, P. *Foundations of Algebraic Analysis***. Masaki Kashiwara, Takahiro Kawai, Tatsuo Kimura. Transl: Goro Kato. Math. Ser., V. 37. Princeton U Pr, 1986, xii + 254 pp, \$38. [ISBN: 0-691-08413-0] Microlocal analysis refers to the local study of differential equations on cotangent bundles of manifolds. This book provides a thorough description of microlocal analysis. It includes microfunction theory and its application to differential equations and theoretical physics. It also describes microdifferential equations and the microlocalization of linear differential equations. AM

**Partial Differential Equations, T(17-18), P, L. *An Introduction to Fast Fourier Transform Methods for Partial Differential Equations, With Applications***. Morgan Pickering. Appl. & Eng. Math. Ser., V. 4. Research Studies Pr (US Dist: Wiley), 1986, xi + 178 pp, \$49.95. [ISBN: 0-471-91261-1] Mathematical theory; problems susceptible to direct solution; the cyclic reduction method; problems on irregular regions; applications to two more general problems. Traces modern developments. Cites appropriate software packages. DFA

**Partial Differential Equations, P. *Partial Differential Relations***. Mikhael Gromov. Ser. of Mod. Surv. in Math., B. 9. Springer-Verlag, 1986, ix + 363 pp, \$60. [ISBN: 0-387-12177-3] Given a fibration of  $X$  over a space  $V$ , a differential relation imposed on sections of this fibration is a subset  $R$  of the bundle of  $n$ -jets of smooth sections over  $V$ . A solution of the differential relation corresponds to a section of  $X$  over  $V$  whose  $n$ -jet lies in  $R$ . For example, consider the fibration of the plane over the line taking coor-

dinates  $(x, y)$  to  $x$ . The bundle of one jets may be identified as 3-space with coordinates  $(x, y, y')$ . The differential equation  $y' = xy$  then defines a subset of 3-space which is the differential relation. This book examines examples of differential relations arising in differential geometry and discusses the existence and classification of their solutions. AM

**Partial Differential Equations, T\*(15-16: 1). *Boundary Value Problems, Third Edition***. David L. Powers. Harcourt Brace Jovanovich, 1987, x + 419 pp, \$35.95. [ISBN: 0-15-505535-6] Many sections have been rewritten, two chapters have been completely reorganized. New material includes two new sections (on Green's functions in the opening chapter reviewing ordinary differential equations; a convergence proof in the chapter on Fourier series and integrals), some Basic program segments, 200 new exercises, an appendix collecting mathematical formulas. (*First Edition*, TR, January 1973; *Extended Review*, March 1974; *Second Edition*, TR, November 1979.) DFA

**Partial Differential Equations, P. *Nonstrictly Hyperbolic Conservation Laws***. Ed: Barbara Lee Keyfitz, Herbert C. Kranzer. Contemp. Math., V. 60. AMS, 1987, ix + 133 pp, \$19 (P). [ISBN: 0-8218-5069-5] Proceedings of a special session held at the January 1985 meeting of AMS in Anaheim. LAS

**Partial Differential Equations, P. *Lecture Notes in Mathematics-1232: Asymptotic Analysis of Soliton Problems: An Inverse Scattering Approach***. Peter Cornelis Schuur. Springer-Verlag, 1986, vii + 180 pp, \$15.80 (P). [ISBN: 0-387-17203-3] Concerns nonlinear evolution equations solvable by the inverse scattering method. Studies emergence of the solitons and uses an almost uniform method to obtain the asymptotic behavior for large time of solutions of soliton problems. Rigorous. DFA

**Partial Differential Equations, P. *Semigroups, Theory and Applications***. Ed: H. Brezis, M.G. Crandall, F. Kappel. Longman Scientific & Technical (US Distr: Wiley), 1986, \$34.95 (P) each. *Volume I*, Res. Notes in Math. Ser., V. 141, 252 pp, [ISBN: 0-470-20372-2]; *Volume II*, Res. Notes in Math. Ser., V. 152, 252 pp. [ISBN: 0-470-20383-8] Papers from a course in 1984 at the International Center for Theoretical Physics, in Trieste, Italy. Applications of semigroups to differential equations and physics, mostly via operator algebras. *Volume I*: twenty-eight short papers, mostly research results. *Volume II*: seven longer papers, partly expository. BC

**Numerical Analysis, T(18), P. *Nonlinear Approximation Theory***. Dietrich Braess. Ser. in Comput. Math., V. 7. Springer-Verlag, 1986, xiv + 290 pp, \$69.50. [ISBN: 0-387-13625-8] Monograph on advanced aspects of approximation theory directed towards researchers, but can be used as a text by stu-



dents with knowledge of analysis and functional analysis. Covers methods in local and global best approximation, best rational approximation, approximation by exponential sums, and Chebyshev approximation by  $\gamma$ -polynomials. Includes examples, exercises, references. LC

**Numerical Analysis, P.** *Lecture Notes in Mathematics-1228: Multigrid Methods II*. Ed: W. Hackbusch, U. Trottenberg. Springer-Verlag, 1986, vi + 335 pp, \$27.80 (P). [ISBN: 0-387-17198-3] A selection of papers from an October 1985 conference at the University of Cologne emphasizing the application of multigrid techniques to problems of fluid and aerodynamics, and touching on new opportunities provided by parallel processing. LAS

**Numerical Analysis, T(15-16), S, L.** *Computational Numerical Methods*. Chris Phillips, Barry Cornelius. Ser. in Comput. & Their Applic. Halsted Pr, 1986, 375 pp, \$51.95. [ISBN: 0-470-20336-6] Attempts to describe root finding, linear systems of equations, approximation, quadrature, and ordinary differential equations in a way not mathematically demanding. Written with computer scientists and engineers in mind, the book discusses relative performance of various numerical methods and the limitations of various methods. Code for some programs is included in both Pascal and Algol 68. AWR

**Numerical Analysis, P.** *Numerical Analysis*. Ed: D.F. Griffiths, G.A. Watson. Res. Notes in Math. Ser., V. 140. Longman Scientific & Technical (US Distr: Wiley), 1986, 262 pp, \$42.95 (P). [ISBN: 0-470-20669-1] Papers of 16 invited talks at the 11th Dundee biennial conference on numerical analysis, held at the University of Dundee in June 1985. DFA

**Numerical Analysis, P.** *Numerical Methods for Fluid Dynamics II*. Ed: K.W. Morton, M.J. Baines. Inst. of Math. & Its Applic. Conf. Ser., V. 7. Clarendon Pr, 1986, xv + 679 pp, \$95. [ISBN: 0-19-853610-0] Proceedings of an April 1985 conference on computational methods in aerodynamics and fluid dynamics at the Institute of Mathematics and Its Applications at Reading, England. LAS

**Numerical Analysis.** *Supplement to Table of Sines and Cosines to Ten Decimal Places at Thousandths of a Degree*. Herbert E. Salzer, Norman Levine. Applied Science Pub (POB 5399, Grand Central Station, NY 10163), 1986, 68 pp, \$3.50 (P). [ISBN: 0-915061-02-3] An addendum to a 1962 Pergamon Press *Table of Sines and Cosines* containing a proof of error bounds in the original volume and a supplementary table for small angles giving ten significant figures instead of the original volume's ten decimal places. LAS

**Functional Analysis, S(17-18), P.** *Lecture Notes in Mathematics-1227: The Spectral Theorem*. Henry Helson. Springer-Verlag, 1986, vi + 104 pp, \$12.80

(P). [ISBN: 0-387-17197-5] Based on lectures given at the summer school for graduate students, Mathematical Institute, Nankai University, Tianjin, China, June-July 1985. Chapters on multiplicity of spectral measures, the spectral theorem, Bochner's theorem, distribution of cocycles, cocycles on the line. References. RJA

**Functional Analysis, T(17), S, P.** *Fundamental Principles of the Theory of Extremal Problems*. Vladimir M. Tikhomirov. Transl: Bernd Luderer. Wiley, 1986, 136 pp, \$27. [ISBN: 0-471-90563-1] Beautiful little book, set in the context of normed linear spaces, that cites three basic facts (contraction mapping principle, Banach's theorem on inverse mapping, the Hahn-Banach theorem) from which one develops a unified point of view for extremal problems in the calculus of variations, optimal control theory, and convex programming. Compact! AWR

**Functional Analysis, P.** *Transform Analysis of Generalized Functions*. O.P. Misra, J.L. Lavoine. Math. Stud., V. 119. Elsevier Science, 1986, xiv + 332 pp, \$48.25 (P). [ISBN: 0-444-87885-8] Concentrating on finite parts of integrals, generalized functions and distributions, this work gives a unified treatment of the distributional setting with transform analysis, i.e., Fourier, Laplace, Stieltjes, Mellin, Hankel, and Bessel series. It includes solutions to sample problems in mathematical physics as well as information on distributional solutions of differential, partial differential, and integral equations. MU

**Functional Analysis, P.** *Two Applications of Functional Analysis*. Sudarsan Nanda. Papers in Pure & Appl. Math., No. 74. Queen's U, 1986, 150 pp, (P). Notes used by the author in two series of lectures delivered in several places. The first series, matrix transformations and sequence spaces, is a review article giving "almost all known results" on the topic; the second series, complementarity and generalized convexity in mathematical programming, includes a table summarizing "most of the important types of generalized convex sets and functions," together with references. Set from typewritten copy. AWR

**Functional Analysis, P.** *Functional Analysis and Two-point Differential Operators*. John Locker. Res. Notes in Math. Ser., V. 144. Longman Scientific & Technical (US Distr: Wiley), 1986, 257 pp, \$44.95 (P). [ISBN: 0-470-20382-X] Studies two-point differential operators and linear boundary value problems in the Hilbert space  $L^2[a, b]$ , emphasizing modern operator theory viewpoint. LC

**Functional Analysis, P.** *Geometry of Normed Linear Spaces*. Ed: R.G. Bartle, et al. Contemp. Math., V. 52. AMS, 1986, xi + 171 pp, \$18 (P). [ISBN: 0-8218-5057-1] Proceedings of a June 1983 conference on geometry of normed linear spaces, held in honor of M.M. Day, one of the founders of the subject. In-

cludes sixteen papers on geometric properties of and geometric methods applied to normed linear spaces. With a valedictory poem, in Poe's style. PZ

**Analysis, P. *Thirteen Papers in Analysis*.** R.R. Sunchelev, *et al.* Transl: Ben Silver. AMS Transl. Ser. 2, V. 133. AMS, 1986, v + 122 pp, \$46. [ISBN: 0-8218-3109-7] Selection of papers from various USSR journals originally published between 1977 and 1983. LAS

**Algebraic Geometry, P. *The Curves Seminar at Queen's, Volume IV*.** Ed: Anthony V. Geramita. Papers in Pure & Appl. Math., No. 76. Queen's U, 1986, 273 pp, (P). A collection of 13 expository papers covering a variety of topics including zeta functions, locally complete intersections, and standard bases for ideals. SG

**Algebraic Geometry, S(18), P. *Residues and Traces of Differential Forms via Hochschild Homology*.** Joseph Lipman. Contemp. Math., V. 61. AMS, 1987, vii + 95 pp, \$16 (P). [ISBN: 0-8218-5070-9] Provides an elementary development of the theory of residues as a formal algebraic construct, bypassing duality theorems as motivation and thus simplifying many proofs. "Hard" results include a formula for residues with respect to powers of quasi-regular sequences, and a trace formula expressing an adjoint-type relationship between trace and cotrace maps in the Hochschild formalism. MR

**Algebraic Geometry, P. *Topics on Families of Projective Schemes*.** Edoardo Sernesi. Papers in Pure & Appl. Math., No. 73. Queen's U, 1986, 203 pp, (P). An introduction to the study of families of projective schemes with an emphasis on Hilbert schemes. SG

**Differential Geometry, P. *Separation of Variables for Riemannian Spaces of Constant Curvature*.** E.G. Kalnins. Mono. & Surv. in Pure & Appl. Math., V. 28. Longman Scientific & Technical (US Distr: Wiley), 1986, 172 pp, \$56.95. [ISBN: 0-470-20366-8] Aims to show how all the actual inequivalent separable coordinate systems can be computed for the Hamilton-Jacobi and Helmholtz equations on real positive definite Riemannian spaces of constant curvature. Includes results on the classification of separable coordinate systems on the  $n$ -sphere, on Euclidean  $n$ -sphere, and on the upper sheet of the  $n$ -hyperboloid. AM

**Differential Geometry, P. *Einstein Manifolds*.** Arthur L. Besse. Ser. of Mod. Surv. in Math., B. 10. Springer-Verlag, 1987, xii + 510 pp, \$89. [ISBN: 0-387-15279-2] An Einstein manifold is a manifold that admits a Riemannian structure with constant Ricci curvature. For two-dimensional manifolds, this notion coincides with the notion of constant Gaussian curvature. In this case it is known that every compact surface admits at least one Riemannian struc-

ture of constant curvature and these structures form a finite dimensional submanifold in the moduli space of Riemannian structures. The book explores the conjecture that constant Ricci curvature is the appropriate generalization of the concept of constant curvature. AM

**Differential Geometry, P\*\*\*. *Nonlinear Analysis in Geometry*.** Shing Tung Yau. L'Enseignement Math, 1986, 54 pp, (P). An account of three lectures given by the author at the ETH-Zurich on November 20, 27, and December 1, 1981 under the sponsorship of the International Mathematical Union. Surveys recent work and trends in Kahler geometry, minimal surfaces, semi-linear equations, and questions about the spectrum of the Laplacian. AM

**Differential Geometry, P. *Variational Methods for Free Surface Interfaces*.** Ed: Paul Concus, Robert Finn. Springer-Verlag, 1987, x + 204 pp, \$36. [ISBN: 0-387-96396-0] In the Plateau problem, one is looking for a minimal surface spanning a fixed boundary. If one prescribes the boundary of the minimal surface to lie in a given submanifold, one has an example of a free boundary problem. This book is a collection of 23 papers recording the proceedings of a conference held at Vallombrosa Center, Menlo Park, California, September 7-12, 1985. AM

**Differential Geometry, P. *Lecture Notes in Mathematics-1201: Curvature and Topology of Riemannian Manifolds*.** Ed: K. Shiohama, T. Sakai, T. Sunada. Springer-Verlag, 1986, vii + 336 pp, \$26.40 (P). [ISBN: 0-387-16770-6] Proceedings of the seventeenth Taniguchi International Symposium at Katato, Japan in August 1985, and of a conference at the Research Institute for Mathematical Science, Kyoto University, September 1985. BH

**Differential Geometry, S(17-18), P. *Lecture Notes in Mathematics-1207: Spectral Geometry: Direct and Inverse Problems*.** Pierre H. Bérard. Springer-Verlag, 1986, xiii + 272 pp, \$23.40 (P). [ISBN: 0-387-16788-9] Spectral geometry refers to the relationship between the geometry of a Riemannian manifold and the set of eigenvalues of its Laplace-Beltrami operator. The book discusses the background of this problem, surveys recent work, and includes several new results related to isoperimetric inequalities and the topology of Riemannian manifolds. AM

**Differential Geometry, S(16-18), P. *The Classical Differential Geometry of Curves and Surfaces*.** Georges Valiron. Transl: James Glazebrook. Lie Groups: History, Frontiers and Applications, V. XV. Math Science Pr, 1986, viii + 268 pp, \$50. [ISBN: 0-915692-39-2] Translation from French of volume two of Valiron's *Cours d'analyse mathématique* dealing with curves and surfaces in three-dimensional space

and first- and second-order partial differential equations in two variables. Part of Robert Hermann's series of classics in differential geometry. BC

**Geometry, S(16-17), P, L\***. *An Adventure in Multidimensional Space: The Art and Geometry of Polygons, Polyhedra, and Polytopes*. Koji Miyazaki. Wiley, 1986, vii + 112 pp, \$49.95. [ISBN: 0-471-81648-5] Remarkable figures, photographs and drawings illustrating a variety of views of the role of polygons (2-polytopes), polyhedra (3-polytopes), and 4-polytopes in two-, three-, and four-dimensional worlds, covering various ages and countries, with emphasis on Japan's past. In the author's words, "The stars of the show are Plato and polygons, Kepler and polyhedra, Fuller and polytopes." This slim, expensive volume was translated from the original 1983 Japanese language edition with (English) title *Forms of Space*. JK

**Geometry. Proceedings of the 1984 Vancouver Conference in Algebraic Geometry**. Ed: J. Carrell, A.V. Geramita, P. Russell. Conf. Proc., V. 6. AMS, 1986, viii + 503 pp, \$56 (P). [ISBN: 0-8218-6010-0] Proceedings of the conference held July 2-12, 1984 at the University of British Columbia, Vancouver, British Columbia, Canada. JAS

**Differential Topology, P. Lecture Notes in Mathematics-1214: Global Analysis—Studies and Applications II**. Ed: Yu. G. Borisovich, Yu. E. Gliklikh. Springer-Verlag, 1986, 275 pp, \$23.60 (P). [ISBN: 0-387-16821-4] A follow-up to *LNM-1108*: fourteen papers translated from Russian, on new developments (1985-86) in global analysis. Varying amounts of detail. BC

**Topology, P. Topological Dynamiz.** J.C.S.P. van der Woude. CWI Tract, V. 22. Math Centrum, 1986, 298 pp, Dfl. 44.90 (P). [ISBN: 90-6196-298-6] Develops structure theory of minimal topological transformation groups (ttgs) with primary focus on quasi-factors of minimal ttgs, (weak) disjointness of homomorphisms of ttgs, and the equicontinuous structure relation. BH

**Topology, P. On the Existence of Natural Non-topological, Fuzzy Topological Spaces**. R. Lowen. Res. & Expos. in Math., V. 11. Heldermann Verlag, 1985, xvi + 183 pp, \$34 (P). [ISBN: 3-88538-211-3] A fuzzy topology on a set  $X$  is a collection of functions  $\mu: X \rightarrow [0, 1]$  which are closed for finite infima and arbitrary suprema and contain all constant functions. Text develops basic theory of fuzzy topologies and applies this theory to spaces of probability measures and spaces of upper semicontinuous functions on a uniform space. Extensive bibliography. BH

**Topology, P. Convergence Structures 1984**. Ed: Josef Novák, et al. Akademie-Verlag, 1985, 254 pp, (P). Proceedings of a conference held in Bechyně, Czechoslovakia from September 24-28, 1984. JAS

**Game Theory, P. Non-Antagonistic Games**. Yu. B. Germeier. Transl: Anatol Rapoport. Theory & Decision. Lib., V. 46. D Reidel, 1986, xiii + 331 pp, \$69. [ISBN: 90-277-2023-1] A study of strategies for competitive games in which the players interests' partially coalesce, emphasizing iterated games, voluntarily revealed information, bluffing, and other realistic options. Translation of a 1976 Russian monograph *Igry s Nieprotivopolozhnymi Interesami*. LAS

**Game Theory, S\*(13-15), L\***. *The Compleat Strategyst: Being a Primer on the Theory of Games of Strategy*. J.D. Williams. Dover, 1986, xvi + 268 pp, \$5.95 (P). [ISBN: 0-486-25101-2] An unabridged republication of the 1966 revised edition (TR, January 1967) of a classic first published in 1954. Written as the very first lay introduction to the new theory of games that emerged from war-related research, it remains a lucid, entertaining account of enduring value. LAS

**Optimization, S(15-16), P. Quasidifferential Calculus**. Vladimir F. Dem'yanov, Alexander M. Rubinov. Transl. Ser. in Math. & Eng. Optimization Software, 1986, xi + 289 pp, \$72. [ISBN: 0-911575-35-9] A preliminary chapter explains the relationship of quasidifferentials to optimization. The remainder of the book develops properties of quasidifferentiability (a concept introduced in 1979) and applies them to standard topics in optimization. Reads nicely. AWR

**Optimization, P. Tree Network and Planar Rectilinear Location Theory**. A.J.W. Kolen. CWI Tract, V. 25. Math Centrum, 1986, iii + 85 pp, Dfl. 12.50 (P). [ISBN: 90-6196-300-1] Location theory deals with the problem of finding points whose sums of distances from a fixed set of points is a minimum. This monograph considers discrete location theory, in which the underlying structure is a tree, and planar location theory in which the underlying structure is a plane. Assumes some mathematical programming. LC

**Dynamical Systems, P. Lecture Notes in Mathematics-1211: Reversible Systems**. M.B. Sevryuk. Springer-Verlag, 1986, v + 319 pp, \$27.80 (P). [ISBN: 0-387-16819-2] Kolmogorov-Arnold-Moser (KAM) theory describes the preservation of quasi-periodic motion under a small perturbation of a non-degenerate integrable Hamiltonian system. A system of differential equations associated with a vector field  $V$  is called reversible if there exists an involution transforming  $V$  into  $-V$ . This book examines the generalization of KAM theory to the context of integrable reversible systems. AM

**Dynamical Systems, P\*. Inverse Problems in Vibration**. G.M.L. Gladwell. Martinus Nijhoff (US Distr: Kluwer Academic), 1987, x + 263 pp, \$79.50. [ISBN: 90-247-3408-8] Non-rigorous introduction to

the problem of constructing a model given spectral data for which there is a unique vibrating system of a specified type. Covers discrete systems and one-dimensional continuous systems governed by differential equations of order 2 or 4. JK

**Dynamical Systems, P.** *Multiparameter Bifurcation Theory*. Ed: Martin Goklubitsky, John M. Guckenheimer. Contemp. Math., V. 56. AMS, 1986, xvii + 387 pp, \$34 (P). [ISBN: 0-8218-5060-1] Proceedings of an AMS summer research conference held in Arcata, California in July 1985. Participants included "scientists working on fluid instabilities and chemical reactor dynamics as well as mathematicians interested in multiparameter bifurcation." BH

**Dynamical Systems, P.** *Lecture Notes in Mathematics-1222: Invariant Manifolds, Entropy and Billiards; Smooth Maps with Singularities*. Anatole Katok, Jean-Marie Strelcyn. Springer-Verlag, 1986, viii + 283 pp, \$23.60 (P). [ISBN: 0-387-17190-8] Existence of invariant manifolds for smooth maps with singularities; absolute continuity; estimation of entropy from below and from above through Lyapunov characteristic exponents; plane billiards as smooth dynamical systems with singularities. DFA

**Control Theory, P.** *Geometric Measure Theory and the Calculus of Variations*. Ed: William K. Allard, Frederick J. Almgren, Jr. Proc. of Symp. in Pure Math., V. 44. AMS, 1985, xiv + 464 pp, \$59. [ISBN: 0-8218-1470-2] Proceedings of the Thirty-Second Summer Research Institute of the AMS held at Humboldt State University in Arcata, California, July 16-August 3, 1984. JAS

**Systems Theory, P.** *Dynamics of Hierarchical Systems: An Evolutionary Approach*. J.S. Nicolis. Ser. in Synergetics, V. 25. Springer-Verlag, 1986, xv + 397 pp, \$66. [ISBN: 0-387-13323-2] A mathematical investigation of the interaction of complex systems in a changing environment with emphasis on the physical bases for the exchange of information. LAS

**Probability, P.** *Probability, Statistical Mechanics, and Number Theory: A Volume Dedicated to Mark Kac*. Ed: Gian-Carlo Rota. Adv. in Math., Suppl. Stud., V. 9. Academic Pr, 1986, xi + 194 pp, \$59.50. [ISBN: 0-12-598543-6] A collection of twelve papers dedicated to the memory of Marc Kac. CEC

**Probability, P.** *Random Polynomials*. A.T. Bharucha-Reid, M. Sambandham. Prob. & Math. Stat. Academic Pr, 1986, xv + 206 pp, \$29.95 (P); \$49.50. [ISBN: 0-12-095711-6; 0-12-095710-8] The first book to present a fairly comprehensive treatment of random algebraic, orthogonal, and trigonometric polynomials, including in-depth coverage of expectation, variance, maxima, and distribution of the number of real zeros of random polynomials. Computer generated results are included to illustrate the theory. LCL

**Probability, P.** *Random Mappings*. Valentin F. Kolchin. Transl. Ser. in Math. & Eng. Optimization Software, 1986, xiv + 207 pp, \$80. [ISBN: 0-911575-16-2] Considers probabilistic methods used to study combinatorial questions, in particular, the behavior of one-to-one mappings of a finite set onto itself as the size of the set tends to infinity. LC

**Probability, P.** *Lecture Notes in Mathematics-1210: Probability Measures on Groups VIII*. Ed: H. Heyer. Springer-Verlag, 1986, x + 386 pp, \$31.70 (P). [ISBN: 0-387-16806-0] Proceedings of a November 1985 Oberwolfach conference, the eighth in a series begun in 1970: six survey lectures and 20 research papers. LAS

**Probability, P\*.** *Monte Carlo Methods, Volume I: Basics*. Malvin H. Kalos, Paula A. Whitlock. Wiley, 1986, ix + 186 pp, \$29.95. [ISBN: 0-471-89839-2] Unified treatment of Monte Carlo methods (methods that involve "deliberate use of random numbers in a calculation that has the structure of a stochastic process"). Two main themes are random walks and variance reduction techniques (particularly importance sampling). Includes applications to statistical physics, radiation transport, and to the solution of some general integral equations. RSK

**Probability, T(15-16: 1), S, L.** *Probability, An Introduction*. Geoffrey Grimmett, Dominic Welsh. Clarendon Pr, 1986, ix + 211 pp, \$19.95 (P). [ISBN: 0-19-853264-4] Basic ideas of probability up to the central limit theorem by way of moment generating functions, plus branching processes, random walks, and random processes in continuous time. FLW

**Probability, P, L.** *Kiyosi Itô: Selected Papers*. Ed: Daniel W. Stroock, S.R.S. Varadhan. Springer-Verlag, 1987, xxi + 647 pp, \$44. [ISBN: 0-387-96326-X] "K. Itô is the Lebesgue of [stochastic] integration theory (Paley and Wiener were its Riemann)." Beginning with Itô's 1942 doctoral thesis in Tokyo that defines the tangent to an integral curve of probability measures, this *Selecta* offers the major part of Itô's life's work on stochastic integrals, and stochastic differential equations. Includes an introduction by the editors and a professional autobiography by Itô. LAS

**Probability, T(17-18: 1).** *Probability and Statistics, Volume II*. Didier Dacunha-Castelle, Marie Duflo. Transl: David McHale. Springer-Verlag, 1986, xiv + 410 pp, \$32.50. [ISBN: 0-387-96213-1] Translation of the 1983 French edition (see TR, November 1986 of *Volume I*). *Volume II* deals primarily with stochastic processes, statistics of processes, and asymptotic theories. RSK

**Probability, P, L.** *Detection of Changes in Random Processes*. Ed: Laimutis Telksnys. Trans. Ser. in Math. & Eng. Optimization Software, 1986, xiii + 226 pp, \$78. [ISBN: 0-911575-20-0] A collection of

papers on recent advances reported by research centers across the Soviet Union on minimal time detection of change in the properties of a random process, including diverse applications (e.g., seismic data, image segmenting). Includes brief biographies on each of the 32 authors. LAS

**Statistics, T(18: 2), P.** *Empirical Processes with Applications to Statistics*. Galen R. Shorack, Jon A. Wellner. Wiley, 1986, xxxvii + 938 pp, \$59.95. [ISBN: 0-471-86725-X] In the Wiley Series in Probability and Mathematical Statistics. Thorough presentation of the theory of one-dimensional empirical processes, particularly for independent identically distributed random variables. Includes theoretical applications to such topics as tests of fit, bootstrapping, linear combinations of order statistics, rank tests, spacings, and censored data. RSK

**Statistics, T(13: 1).** *Elementary Statistics, Third Edition*. Mario F. Triola. Benjamin/Cummings, 1986, xviii + 663 pp, \$26.95. [ISBN: 0-8053-9327-7] Revision of the author's 1983 *Second Edition* (TR, June-July 1983). New material includes stem-and-leaf plots, box-and-whisker diagrams, one-way analysis of variance with unequal sample sizes, and sections on the nature of data, counting, and  $p$ -values. Also includes several new features, such as case study activities at the end of each chapter, and 40% more exercises. RSK

**Statistics, T\*(18: 1-2), P\*.** *Testing Statistical Hypotheses, Second Edition*. E.L. Lehmann. Wiley, 1986, xx + 600 pp, \$45.95. [ISBN: 0-471-84083-1] In the Wiley Series in Probability and Mathematical Statistics. Updated and expanded version of the author's classic 1959 text. More emphasis is placed on robustness; coverage of confidence intervals, simultaneous inference procedures, admissibility, and multivariate tests has been expanded; a chapter on conditional inference has been added; material on sequential analysis has been removed. Companion volume to the author's 1983 text *Theory of Point Estimation* (TR, April 1984). RSK

**Statistics, P\*.** *COMPSTAT: Proceedings in Computational Statistics*. Ed: F. De Antoni, N. Lauro, A. Rizzi. Physica-Verlag (US Distr: Springer-Verlag), 1986, xv + 512 pp, \$54.50 (P). [ISBN: 0-387-91286-X] Selection of 72 papers presented at the 7th COMPSTAT Symposium held in Rome in 1986. Includes papers in the following general areas: information science and statistics, probabilistic models in exploratory data analysis, computational approach of inference, numerical aspects, three-mode data matrices, cluster analysis, robustness in multivariate analysis, computer graphics, expert systems, statistical software, clinical trials, econometric computing, statistical data base management systems, and teaching of computational statistics. RSK

**Statistics, P\*\*.** *The Collected Works of John W. Tukey*. Ed: Lyle V. Jones. Stat. & Prob. Ser. Wadsworth, 1986. *Volume III: Philosophy and Principles of Data Analysis: 1949-1964*, lxviii + 569 pp, [ISBN: 0-534-03305-9]; *Volume IV: Philosophy and Principles of Data Analysis: 1965-1986*, lxviii, + 553 pp. [ISBN: 0-534-05101-4] Further volumes of a projected series covering Tukey's many contributions to statistics (see TR's, May 1985 of *Series and Volume I*, February 1986 of *Volume II*). These volumes contain 30 papers, including some previously unpublished, in which the dominant issue is his philosophy of research and data analysis. Emphasis is on the need for exploratory as well as confirmatory data analysis. Includes comments by the editor on each of the papers. RSK

**Statistics, S(16-17), P.** *A Guide to Statistical Methods and to the Pertinent Literature*. Lothar Sachs. Springer-Verlag, 1986, xi + 212 pp, \$25 (P). [ISBN: 0-387-16835-4] Contains approximately 5500 alphabetically arranged keywords and subject headings related to statistical methodology, with references to a bibliography of 1449 articles and books where further details can be found. Includes many German terms and references. RSK

**Statistics, T(18), S, P.** *Recursive Estimation and Control for Stochastic Systems*. Han-Fu Chen. Wiley, 1985, x + 378 pp, \$39.95. [ISBN: 0-471-81566-7] Text and reference on convergence of recursive estimates in discrete- and continuous-time systems. Main tools are probability theory and ordinary differential equations. Topics include stochastic approximation algorithms, linear unbiased minimum variance estimates for continuous-time systems, singularity problems, and Gauss-Markov estimation for continuous-time systems. KK

**Statistics, S(13), L.** *Misused Statistics: Straight Talk for Twisted Numbers*. A.J. Jaffe, Herbert F. Spier. Popular Stat., V. 5. Dekker, 1987, xi + 237 pp, \$29.75. [ISBN: 0-8247-7631-3] A popular polemic against abuses of numbers, with extensive examples: bad data, faulty interpretation, "horror pictures," surveys and polls. Neither teaches nor uses statistical methods. A good resource for examples. LAS

**Statistics, T(13-14: 1), L.** *Think and Explain with Statistics*. Lincoln E. Moses. Addison-Wesley, 1986, xii + 483 pp, \$28.95. [ISBN: 0-201-15619-9] Presupposes no college mathematics. The usual topics with much use of graphs and intuitive explanations for mathematical results. FLW

**Statistics, P.** *Selected Tables in Mathematical Statistics, Volume 10*. Ed: R.E. Odeh, J.M. Davenport. AMS, 1986, xi + 347 pp, \$39. [ISBN: 0-8218-1910-0] Contains two tables: percentile points of the distribution of positive definite quadratic forms for samples up through size 10, and confidence limits on

the correlation coefficient for various sample sizes up through 1000. RSK

**Statistics, T\*(13-15: 1), S\*, P, L\*.** *Counting for Something: Statistical Principles and Personalities.* William S. Peters. Texts in Stat. Springer-Verlag, 1986, xviii + 275 pp, \$33. [ISBN: 0-387-96364-2] An elementary introduction to descriptive statistics "counting and measuring"—embedded in a thoughtful, thorough discussion of the history of probability (Laplace) and statistics (Pearson, Fischer, Neyman). Exquisite examples from the social sciences, ancient and modern, enrich this literate exposition of the basic ideas of modern statistics. LAS

**Statistics, P.** *Lecture Notes in Statistics-38: Survey Research Designs: Towards a Better Understanding of Their Costs and Benefits.* Ed: R.W. Pearson, R.F. Boruch. Springer-Verlag, 1986, v + 129 pp, \$15.80 (P). [ISBN: 0-387-96428-2] General approaches to the question of allocating resources or choosing among various research designs followed by presentations and comparisons of the costs and benefits associated with specific large-scale research designs—cross sectional, longitudinal, and social experiments. LCL

**Statistics, P.** *Small Area Statistics: An International Symposium.* Ed: R. Platek, et al. Ser. in Prob. & Math. Stat. Wiley, 1987, xiv + 278 pp, \$39.95. [ISBN: 0-471-84456-X] A report on the symposium held in Ottawa in May 1985 to consider recent results related to the collection and use of data from geographically-integrated small areas. FLW

**Statistics, P.** *Analysis of Categorical Data.* Gary G. Koch, Peter B. Imrey, et al. Pr U Montreal, 1985, 288 pp, \$22 (P). [ISBN: 2-7606-0733-X] Based on lectures given by Koch at the 21st Session of the Séminaire de mathématiques supérieures—NATO Advanced Study Institute on Data Analysis at the Université de Montréal in the summer of 1982. Emphasizes weighted least squares methods, with comparisons to maximum likelihood methods for fitting log-linear models and randomization model methods. RSK

**Statistics, S(15-18), P, L\*.** *New Developments in Statistics for Psychology and the Social Sciences.* Ed: A.D. Lovie. British Psychological Society (US Distr: Methuen), 1986, ix + 177 pp, \$55. [ISBN: 0-901715-46-8] Brief discussions of new methods concerning graphics, robust procedures, outliers, cross-classified data, longitudinal studies, mixtures of distributions, sample size and power, and the ranking and selection of populations. Extensive bibliographies. FLW

**Statistics, P.** *Ordination and Classification.* P.G.N. Digby, J.C. Gower. Pr U Montreal, 1986, 87 pp, \$16 (P). [ISBN: 2-7606-0742-9] Based on ten lectures given by Gower at the 21st Session of the Séminaire de mathématiques supérieures—NATO Advanced Study Institute on Data Analysis at the Uni-

versité de Montréal in the summer of 1982. Primarily an exploratory data approach to multidimensional scaling, with some general comments on classification. RSK

**Statistics, T(18: 1), P.** *Foundations of Optimum Experimental Design.* Andrej Pázman. Math. & Its Applic. D Reidel, 1986, xv + 228 pp, \$39. [ISBN: 90-277-1865-2] Translation with some revisions of the 1980 Czechoslovakian *First Edition*. Presents the mathematical background for developing and computing optimal designs, emphasizing the linear theory of estimation and the convex theory of experimental design. RSK

**Statistics, S(16-18).** *Multivariate Statistical Methods: A Primer.* Byran F.J. Manly. Chapman & Hall, 1986, x + 159 pp, \$15.95 (P); \$35. [ISBN: 0-412-28620-3; 0-412-28610-6] Attempts to give an "idea of what can and what cannot be achieved" by some multivariate methods. Brief discussions of matrix algebra, principal component analysis, factor analysis, discriminant analysis, cluster analysis, canonical correlation, and multidimensional scaling. FLW

**Statistics, P\*, L.** *Statistics and the Law.* Ed: Morris H. DeGroot, Stephen E. Fienberg, Joseph B. Kadane. Wiley, 1986, xviii + 484 pp, \$39.95. [ISBN: 0-471-09435-8] In the Wiley Series in Probability and Mathematical Statistics. Interesting collection of articles describing a wide variety of applications of statistical ideas in legal settings, many of which are controversial, together with cases in which statistical analyses were important elements. RSK

**Statistics, S(15-17).** *A Topical Dictionary of Statistics.* Gary L. Tietjen. Chapman & Hall, 1986, ix + 171 pp, \$22.50. [ISBN: 0-412-01201-4] A dictionary in which the terms are not defined in isolation but rather within the context of one of fifteen topical chapters. An alphabetic index indicates the appropriate page. RSK

**Statistics, T(18: 1, 2), P\*.** *Asymptotic Methods in Statistical Decision Theory.* Lucien Le Cam. Ser. in Stat. Springer-Verlag, 1986, xxvi + 742 pp, \$49.95. [ISBN: 0-387-96307-3] Well-organized treatment of asymptotic methods within the framework of Wald's decision theory. Main theme is the approximation of complex statistical experiments by experiments that are known and mathematically tractable. RSK

**Statistics, P.** *Jack Carl Kiefer, Collected Papers: Supplementary Volume.* Ed: Lawrence D. Brown, et al. Springer-Verlag, 1986, vi + 56 pp, \$20. [ISBN: 0-387-96383-9] Contains additional commentaries on papers from *Volume I* and *Volume II* of Kiefer's *Collected Papers* (TR, October 1985), which apparently were inadvertently omitted. RKS

**Statistics, T(14-17: 1, 2), P.** *Quality Control and Industrial Statistics, Fifth Edition.* Acheson J. Duncan. Richard D Irwin, 1986, xxii + 1123 pp, \$39.95. [ISBN: 0-256-03535-0] Revision of the author's 1974 *Fourth Edition*, designed to bring the book up-to-date with respect to sampling standards, to make it more cost-oriented, and to bring it more in harmony with the use of computers. Contains major sections on acceptance sampling plans and control charts, in addition to standard statistical topics. RSK

**Statistics, S(14-16), P\*, L.** *Graphical Exploratory Data Analysis.* S.H.C. du Toit, A.G.W. Steyn, R.H. Stumpf. Texts in Stat. Springer-Verlag, 1986, ix + 314 pp, \$28. [ISBN: 0-387-96313-8] Provides a survey of the best known and most widely used methods of analyzing and portraying data graphically, amply illustrated with real data. Includes working computer programs for most cases, particularly using the SAS and BMDP packages. RSK

**Statistics, T(16-18: 1, 2), S, P, L.** *Density Estimation for Statistics and Data Analysis.* B.W. Silverman. Mono. on Stat. & Appl. Prob. Chapman & Hall, 1986, ix + 175 pp, \$29.95. [ISBN: 0-412-24620-1] Readable treatment of density estimation (estimation of unknown probability density function from observed data). Emphasis on nonparametric estimation. Includes a survey of existing methods with concentrated treatments of some of these. KK

**Statistics, T(13-14: 1), L.** *Introduction to Statistics.* J.S. Milton, J.J. Corbet, P.M. McTeer. DC Heath, 1986, xiii + 593 pp, \$29.95. [ISBN: 0-669-06209-X] Presupposes no college mathematics. Takes up the usual topics with more emphasis on probability than usual at this level. Optional sections give an introduction to SAS. FLW

**Computer Literacy, S, P, L.** *The Control Revolution: Technological and Economic Origins of the Information Society.* James R. Beniger. Harvard U Pr, 1986, xi + 493 pp, \$25. [ISBN: 0-674-16985-9] A scholarly historical treatise liberally laced with trite aphorisms of the information age ("organization man," "micro millenium," "third wave"). Traces the origin of feedback and control in social systems in an effort to determine why it is information rather than, say, production that plays an increasingly crucial role in society. LAS

**Computer Programming, S, L.** *Advanced Applications for Introduction to Pascal with Applications in Science and Engineering.* Susan Finger, Ellen Finger. DC Heath, 1986, vi + 138 pp, \$1.95 (P). [ISBN: 0-669-12059-6] Intended as a companion to the book named in the title, but useable with other texts. Nine applications and case studies: linear interpolation, discrete-time systems, numerical differentiation, numerical integration, roots of equations, quick sort, determinants, linear systems, matrix op-

erations. Not all students will have the necessary mathematical prerequisites. DFA

**Computer Programming, T(14-15: 1), S, L.** *The World of Programming Languages.* Michael Marcotty, Henry Ledgard. Books on Prof. Comput. Springer-Verlag, 1987, xiv + 360 pp, \$29.95. [ISBN: 0-387-96440-1] A systematic introduction to elements of programming languages (e.g., data types, nesting, dynamically varying structures), one per chapter, with apt illustrations to appropriate programming languages (e.g., PL/I, Pascal, Ada). LAS

**Computer Programming, T?(1).** *Programming in Micro-Prolog.* Hugh de Saram. Ser. in Comp. & Their Applic. Halsted Pr, 1985, 166 pp, (P). [ISBN: 0-470-20218-1] Aimed at home and high school this book presents a substantial introduction to Prolog via a variety of applications including databases and natural language translation. Unfortunately the variant of the language, called micro-PROLOG, is not close to other versions of Prolog, and there are no comparisons with or references to the more standard implementations. Micro-PROLOG does include its own turtle graphics. JAS

**Computer Programming, T\*(13: 1).** *Introduction to Pascal and Structured Design, Second Edition.* Nell Dale, Chip Weems. DC Heath, 1987, xxi + 825 pp, \$27.95 (P). [ISBN: 0-669-09570-2] Over 200 more pages than the *First Edition* (TR, January 1985). More emphasis on problem solving, testing, control and data abstraction, interactive programming. Earlier coverage of procedures. More material on recursion and linked structures; more exercises and nearly twice as many examples. One chapter is devoted entirely to common algorithms applied to arrays. Supplements available for dialects. DFA

**Computer Programming, S\*(13-18).** *6502: Assembly Language Programming, Second Edition.* Lance A. Leventhal. Osborne McGraw-Hill, 1986, xix + 737 pp, \$19.95 (P). [ISBN: 0-07-881216-X] This edition conforms to the fine standards of this series and includes full information about the enhanced 65C02 and associated processors. JAS

**Computer Programming, T(13-18: 1), S.** *A Prolog Primer.* Jean B. Rogers. Addison-Wesley, 1986, xii + 223 pp, \$19.95 (P). [ISBN: 0-201-06467-7] Presents many non-numerical examples. Takes a spiral approach. Lots of explanation and relevant discussion connected to topics and examples. First part is a tutorial and begins with a look at language. The second part—advanced topics—covers efficiency, built-in predicates, I/O, arithmetic, building large programs. Exercises; chapter summaries; appendices; indexes. RJA

**Computer Programming, T\*(13: 1).** *Pascal: Problem Solving and Structured Program Design.* Henry M. Walker. Little Brown, 1986, xxiv + 542

pp, \$29.75 (P). [ISBN: 0-316-91848-2] Very readable text for the CS-I course. True problem-solving orientation. Good choice of examples and programming exercises. Spiral approach to functions, procedures, loops. A separate chapter on program correctness and accuracy, and on trees and recursion. Worth a good look. DFA

**Computer Programming, T\*(13: 1).** *VAX-11 BASIC By Design: Structured Programming in BASIC.* Andrew Kitchen. Prentice-Hall, 1987, xvii + 492 pp, \$21.95 (P). [ISBN: 0-13-940974-2] For beginners. Assumes only high school algebra. Pleasant, even entertaining style. Attractive format. Many examples and exercises. Stresses good programming style but avoids much formalism of structured programming. Suitable for shorter courses and self-study. DFA

**Computer Programming, S(13-15).** *Advanced Modula-2.* Herbert Schildt. Osborne McGraw-Hill, 1987, x + 379 pp, \$18.95 (P). [ISBN: 0-07-881245-3] Advanced programming topics (e.g., sorting, searching, lists, queues, stacks, trees, data compression and codes, expression parsing, some discussion of interfacing and concurrency) usually treated in a data structures or second programming course, all in Modula-2. Readable, but no exercises. RM

**Computer Programming, T(14-15: 1).** *Programming in Assembly Language: MACRO-11.* Edward F. Sowell. Addison-Wesley, 1984, xix + 492 pp, \$28.95. [ISBN: 0-201-07788-4] Number systems, computer arithmetic, assembly language programming, computer organization, addressing modes, I/O, subroutines, macros. RWN

**Software Systems, P.** *Lecture Notes in Computer Science-236: T<sub>E</sub>X for Scientific Documentation.* Ed: Jacques Désarménien. Springer-Verlag, 1986, vi + 204 pp, \$19.80 (P). [ISBN: 0-387-16807-9] Contributions from the second European T<sub>E</sub>X conference held in Strasbourg in June 1986. Topics range from interactive environments to multilingual T<sub>E</sub>X and "theological typesetting"—setting biblical scholarship using mixtures of Latin, Greek, Hebrew, Fraktur, and Gothic fonts. LAS

**Software Systems, P.** *Product Data Interfaces in CAD/CAM Applications: Design, Implementation and Experiences.* Ed: J. Encarnação, R. Schuster, E. Vöge. Symbolic Computation. Springer-Verlag, 1986, xiv + 254 pp, \$68. [ISBN: 0-387-15118-4] Rapidly increasing applications of graphics in engineering and science has led to a great variety of hardware and software products. The incompatibility of these products poses a major obstacle to the goal of systems integration and has brought about efforts to develop standard product data interfaces. This book describes on-going work in this area and contains papers presented in a seminar of the Zentrum

für Graphische Datenverarbeitung held at the Technical University Darmstadt from December 1984 to February 1985. AM

**Software Systems, S(13-15), P, L.** *UNIX Survival Guide.* Elizabeth A. Nichols, Sidney C. Bailin, Joseph C. Nichols. Holt, Rinehart & Winston, 1987, vii + 311 pp, \$15.25 (P). [ISBN: 0-03-000773-9] A well-written introduction to UNIX especially designed for the increasing numbers of new users who are also serving as system managers—because they are using UNIX on small office systems. After files, directories, and editors are introduced, major later chapters deal with processes, utilities, and file system maintenance. A good book from which to learn how UNIX works, not just what the commands do. LAS

**Computer Science, P.** *Pyramidal Systems for Computer Vision.* Ed: Virginio Cantoni, Stefano Levialdi. NATO ASI Ser. F, V. 25. Springer-Verlag, 1986, viii + 392 pp, \$82.50. [ISBN: 0-387-17165-7] Workshop proceedings on pyramid computers (stacks of smaller arrays linked vertically by trees; generalizing arrays and hypercubes). Papers discuss pyramidal languages, algorithm paradigms, digital transforms, VLSI fabrication, and applications to vision, image segmentation, tactile systems. RM

**Computer Science, S, L.** *Taming the Tiger: Software Engineering and Software Economics.* Leon S. Levy. Books on Prof. Comput. Springer-Verlag, 1987, viii + 248 pp, \$25 (P). [ISBN: 0-387-96468-1] An idiosyncratic personal essay on a philosophy of programming (illustrated by AWK) and on models for estimating software development costs, together with a program (with sample runs) to produce these estimates. LAS

**Computer Science, P, L.** *Software Engineering Education: The Educational Needs of the Software Community.* Ed: Norman E. Gibbs, Richard E. Fairley. Springer-Verlag, 1987, xvi + 439 pp, \$32. [ISBN: 0-387-96469-X] Proceedings of a February 1986 workshop held at Carnegie-Mellon University at which leaders in computer science and software engineering from academia, industry, and government assessed the current state of undergraduate and master's education in software engineering. LAS

**Computer Science, P, L.** *Annual Review of Computer Science, Volume 1, 1986.* Ed: Joseph F. Traub, et al. Annual Reviews, 1986, xiv + 459 pp, \$39. [ISBN: 0-8243-3201-6] First volume in a new series of *Annual Reviews*. Fifteen survey papers on a wide variety of topics, from natural language interfaces to dataflow architectures. Integrated subject index. LAS

**Computer Science, P.** *Lecture Notes in Computer Science-213: ESOP 86.* Ed: B. Robinet, R. Wilhelm. Springer-Verlag, 1986, 374 pp, \$22.70 (P). [ISBN: 0-387-16442-1] The proceedings of the European sym-



posium on programming held in Saarbrücken, West Germany, March 17-19, 1986. JAS

**Computer Science.** *Lecture Notes in Computer Science-212: Interval Mathematics 1985.* Ed: K. Nickel. Springer-Verlag, 1986, vi + 227 pp, \$16.40 (P). [ISBN: 0-387-16437-5] Proceedings of a symposium held in Freiburg, West Germany, from September 23-26, 1985. JAS

**Computer Science, P.** *Design and Analysis of Coalesced Hashing.* Jeffrey Scott Vitter, Wen-Chin Chen. Intern. Ser. of Mono. on Comput. Sci. Oxford U Pr, 1987, xii + 160 pp, \$29.95. [ISBN: 0-19-504182-8] Algorithms and analysis of hashing methods for internal search where colliders with different hash addresses are coalesced into single chains. Memory divided into fixed size address portion for hash function, and "cellar" for colliders (which may overflow back into address portion). Analysis of tradeoffs between relative sizes of partition, and of algorithms for insertion to produce optimal performance. RM

**Computer Science, P.** *New Computing Environments: Parallel, Vector and Systolic.* Ed: Arthur Wouk. SIAM, 1986, 270 pp, \$29.50. [ISBN: 0-89871-201-7] Survey articles on recent accomplishments (interaction between hardware, software, algorithms) in parallelism in large scale scientific computations. Discussion of communication costs as well as operation count measures, tools for detecting and utilizing implicit parallelism, granularity at which parallelism is implementable, systolic architecture, local/global memory organization. RM

**Computer Science, S(16-18), P, L.** *Lecture Notes in Computer Science-198: Negation and Control in Prolog.* Lee Naish. Springer-Verlag, 1986, ix + 119 pp, \$14.90 (P). [ISBN: 0-387-16815-X] Work based on author's Ph.D. thesis and done in conjunction with the development of the MU-Prolog system. Text is divided into two parts. First, discussion of how negation as failure can be implemented soundly, including enhancements to current systems and suggestions for future systems. Second, the control of logic programs is treated. Introduces control primitives for database and recursive predicates and uses them to generate control information automatically. This is followed by a re-examination of the theoretical foundations of Prolog systems with flexible computation rules. Two appendices, one being a MU-Prolog reference manual. References. RJA

**Computer Science, T(13-18: 1, 2), S, P, L.** *Programming with Sets: An Introduction to SETL.* J.T. Schwartz, et al. Texts & Mono. in Comput. Sci. Springer-Verlag, 1986, xv + 493 pp, \$45. [ISBN: 0-387-96399-5] SETL, a language that manipulates general finite sets and maps, is a tool for experimenting with algorithms and program design and for

prototyping large systems. Presents major data objects, control structures, program development, testing, backtracking. Latter sections contain advanced material including substantial applications. Exercises; appendices; index. RJA

**Computer Science, T(16-18: 1, 2), S, L.** *Denotational Semantics: A Methodology for Language Development.* David A. Schmidt. Allyn & Bacon, 1986, xiii + 331 pp. [ISBN: 0-205-08974-7] Begins with a survey of semantics specification methods. Covers syntax, semantic domains, denotational semantics, semantics of computer storage, least fixed point semantics, block structure, and data structures. Advanced topics are treated in chapters toward the end of the book. Exercises; suggested readings; bibliography; index. RJA

**Computer Science, P, L.** *Lecture Notes in Computer Science-235: Accurate Scientific Computations.* Ed: Willard L. Miranker, Richard A. Toupin. Springer-Verlag, 1986, xiii + 205 pp, \$19.80 (P). [ISBN: 0-387-16798-6] Concerns applications in mathematics. Different concepts and definitions of "accuracy," ways to achieve it efficiently, algorithms to prove or validate it. Nine papers and three abstracts on evaluating elementary functions, axioms for computer arithmetic, computing inclusions, computer architectures, probabilistic algorithms, computer algebra. From a March 1985 symposium at Bad Neuenahr, West Germany. DFA

**Computer Science, P.** *Lecture Notes in Computer Science-242: Combinators and Functional Programming Languages.* Ed: Guy Cousineau, Pierre-Louis Curien, Bernard Robinet. Springer-Verlag, 1986, v + 208 pp, \$20 (P). [ISBN: 0-387-17184-3] Proceedings of the Thirteenth Spring School of the Laboratoire Informatique Théorique et Programmation, Universités Paris VI-VII and CNRS, held May 6-10, 1985. Papers are mostly tutorial and present the different available formalisms of functions, new and efficient implementation techniques, and two functional programming languages (Amber and Graal). RJA

**Computer Science, P.** *Lecture Notes in Computer Science-241: Foundations of Software Technology and Theoretical Computer Science.* Ed: Kesav V. Nori. Springer-Verlag, 1986, xii + 519 pp, \$36.60 (P). [ISBN: 0-387-17179-7] Proceedings of the Sixth Conference, New Delhi, December 1986. Contains invited talks and sessions on software technology, logic programming and functional programming, algorithms, theory, distributed computing, scheduling, complexity, parallel algorithms. RJA

**Applications, T(16), P, L.** *Decision Theory: An Introduction to the Mathematics of Rationality.* Simon French. Math. & Its Applic. Halsted Pr, 1986, 448 pp, \$54.95. [ISBN: 0-470-20308-0] Aimed at undergraduates, cognizant that not many undergradu-

ates take a course entirely on decision theory, so written as background reading for students in management science, psychology, political science as well as operations research and applied statistics. Good bibliographies on selected topics. Preface claim of prerequisites (a little calculus, a little probability, mathematical maturity for following an argument and understanding notation) seems realistic. An attractive, albeit unusual book, worth looking at. AWR

**Applications.** *Deterministic Aspects of Mathematical Demography.* John Impagliazzo. Biomath., V. 13. Springer-Verlag, 1985, xi + 186 pp, \$34. [ISBN: 0-387-13616-9] A concise exposition of the traditional stable theory of population, from mortality tables to age-specific matrix models, illustrated with extensive tables and graphs of data from Denmark for several centuries. An excellent primer on notation and basic theory. LAS

**Applications, P.** *Lecture Notes in Biomathematics-66: Nonlinear Oscillations in Biology and Chemistry.* Ed: H.G. Othmer. Springer-Verlag, 1986, vi + 289 pp, \$24 (P). [ISBN: 0-387-16481-2] Papers on biological systems, chemical systems, and mathematical methods involving nonlinear dynamics, chaotic behavior, and oscillating systems. From a May 1985 conference sponsored by the Mathematics Department of the University of Utah. LAS

**Applications, P.** *Mathematics Applied to Fluid Mechanics and Stability: Proceedings of a Conference Dedicated to Richard C. DiPrima.* Ed: Donald A. Drew, Joseph E. Flaherty. SIAM, 1986, xii + 295 pp, \$38.50. [ISBN: 0-89871-208-4] The state-of-the-art and future directions in singular perturbations, bifurcation and stability as applied to fluid mechanics and lubrication. Based on 22 lectures given at Rensselaer Polytechnic Institute, September 9-11, 1985. DFA

**Applications (Artificial Intelligence), T\*(16-18: 1, 2), S, L.** *The Elements of Artificial Intelligence: An Introduction Using LISP.* Steven L. Tanimoto. Princip. of Comput. Sci., V. 11. Computer Science Pr, 1987, xxii + 529 pp, \$35.95. [ISBN: 0-88175-113-8] Presents principles and main programming techniques of artificial intelligence. Begins with introduction to field, its relationships to other disciplines, and a word about the literature on artificial intelligence. Chapter two presents LISP which is used in the rest of the text to illustrate examples and present algorithms. Chapters on methodology, knowledge representation, search, logical and probabilistic reasoning, learning, natural language understanding, vision, expert systems. Concluding chapter focuses on the future. Chapter references. Exercises. Appendix of LISP functions. Author and subject indexes. RJA

**Applications (Astronomy).** *Building Blocks of the Universe.* Lorenzo Eric Sepulveda. Water Chem-

istry Eastex (POB 6432, Longview, TX 75608), 1986, 119 pp, \$10 (P). It's a happy thought that mathematics can still be advanced by "amateurs." This treatise, by a self-proclaimed amateur mathematician (a chemist by profession), is primarily "a mathematical treatise about the geometry of four spatial dimensions, concerning those aspects of hypergeometry that are directly relevant to cosmology." In review of the manuscript, H.M.S. Coxeter writes "Your monograph...might well be regarded as an up-to-date version of my joint paper with G.J. Whitrow: 'World Structure and Non-Euclidean Honeycombs,' *Proc. Royal Soc. A* 201 (1950) 417-437." LCL

**Applications (Biology), P, L.** *Lecture Notes in Biomathematics-69: The Mathematical Structure of the Human Sleep-Wake Cycle.* Steven H. Strogatz. Springer-Verlag, 1986, viii + 239 pp, \$22.80 (P). [ISBN: 0-387-17176-2] A well-written comprehensive analysis of the "Rosetta Stone" of data from 22 human subjects who have undertaken lengthy free-sleep experiments in environments totally isolated from clues to the 24 hour day. This analysis leads to surprisingly strong laws of correlation and independence between natural length of sleep, gaps between sleep, and the circadian rhythm of body temperature, as well to striking evidence for alternating periods of cyclic order and nearly random chaos. Concluding with various mathematical models and computer simulation. LAS

**Applications (Biology), P.** *Lecture Notes in Biomathematics-67: Intrinsic Geometry of Biological Surface Growth.* Philip H. Todd. Springer-Verlag, 1986, iv + 128 pp, \$14.20 (P). [ISBN: 0-387-16482-0] An exploration of how the intrinsic geometry of living organisms changes as they grow, based on a detailed application of differential geometry (e.g., Dirichlet integral, quadric surface, numerical approximations) applied to the post-natal folding of ferret brains. LAS

**Applications (Economics), P, L\*.** *Lecture Notes in Economics and Mathematical Systems-271: The Cowles Commission in Chicago, 1939-1955.* Clifford Hildreth. Springer-Verlag, 1986, v + 176 pp, \$19.30 (P). [ISBN: 0-387-16774-9] An intellectual history of econometric ideas developed during the Chicago phase of the Cowles Commission for Research in Economics under the directorships of Jacob Marshak and Tjalling Koopmans: identification in linear probability models, activity analysis, equilibrium, social choice. LAS

**Applications (Economics), T(18), S, P.** *Lecture Notes in Economics and Mathematical Systems-254: Arbitrage Pricing of Contingent Claims.* Sigrid Müller. Springer-Verlag, 1985, viii + 151 pp, \$14.80 (P). [ISBN: 0-387-15973-8] "This book is intended as a contribution to the theory of contingent claim valuation based on arbitrage considerations. It is con-

cerned with preference-free valuations of contingent claims (such as options written on a stock) in frictionless multiperiod securities markets that do not permit arbitrage profits. Besides the question of pricing it considers the possibility of hedging in securities markets." KK

**Applications (Engineering), T(15-16: 1, 2), S, L. Mathematical Foundations for Communication Engineering.** Kenneth W. Cattermole. Halsted Pr, 1985, \$33.95 each. *Volume 1: Determinate Theory of Signals and Waves*, x + 287 pp [ISBN: 0-470-20176-2]; *Volume 2: Statistical Analysis and Finite Structures*, ix + 357 pp. [ISBN: 0-470-20177-0] Mathematics for communication engineering, based on the unity of various linear transforms. *Volume 1:* Fourier transforms in one and several variables. *Volume 2:* Probability and abstract algebra, including coding. Applications throughout to signal processing and filtering. BC

**Applications (Engineering), T(15-16). Mathematical Methods, Second Edition.** Merle C. Potter, Jack Goldberg. Prentice-Hall, 1987, xvi + 639 pp, \$45.95. [ISBN: 0-13-561184-9] Topics for engineers: differential equations, series, Laplace transforms, matrices, Fourier series, numerical methods, complex variables. *First Edition* by Potter alone tried to make topics from advanced mathematics accessible to undergraduate students (TR, February 1979); *Second Edition* includes Goldberg to add some mathematical precision while retaining the undergraduate focus. AWR

**Applications (Engineering), T(17: 1), S, P, L. Theory of Matrix Structural Analysis.** J.S. Przemieniecki. Dover, 1985, xi + 468 pp, \$10 (P). [ISBN: 0-486-64948-2] A corrected and unabridged republication of a book which originally appeared in 1968. Includes an overview of matrix methods applied to the design of aircraft, basic equations of elasticity, equilibrium and compatibility equations, energy theorems, structural idealization, Castigliano's theorem, structured synthesis and nonlinear structural analysis. Also exercises and many illustrations. CEC

**Applications (Engineering), S(14-16), L. Worked Examples in Engineering Mathematics.** L.R. Mustoe. Wiley, 1986, x + 111 pp, \$14.95 (P). [ISBN: 0-471-91171-2] Fifty-three mostly two-part sample problems, with solutions, taken from college engineering exams. The problems aren't bad, but the book is too slim for the price. BC

**Applications (Engineering), P. Design Sensitivity Analysis of Structural Systems.** Edward J. Haug, Kyung K. Choi, Vadim Komkov. Math. in Sci. & Eng., V. 177. Academic Pr, 1986, xvi + 381 pp, \$34.95 (P); \$60. [ISBN: 0-12-332921-3; 0-12-332920-5] For both engineer and mathematician. Considers linear structural mechanics, where the equations

(matrix, ordinary differential, partial differential) are linear in the state variables once the design variable is fixed. Finite-dimensional problems, distributed parameter structural components, structural components with shape as the design, built-up structures. Two of the authors are with the Center for Computer Aided Design at the University of Iowa. DFA

**Applications (Engineering), P. Accuracy Estimates and Adaptive Refinements in Finite Element Computations.** Ed. I. Babuska, et al. Ser. in Num. Methods in Engin. Wiley, 1986, xiv + 393 pp, \$84.95. [ISBN: 0-471-90862-2] 21 papers by invited participants at an international conference in Lisbon in June 1984. Thirteen papers address stationary, elliptic problems; the remainder address transient and flow problems. DFA

**Applications (Engineering), T(18: 2), S. Application of Structural Systems Reliability Theory.** Palle Thoft-Christensen, Yoshisada Murotsu. Springer-Verlag, 1986, viii + 343 pp, \$58. [ISBN: 0-387-16362-X] A graduate text covering relatively new theory of reliability of systems (e.g., offshore oil platforms). Brief introduction to the theory of single structures (e.g., single beams), and level two methods. Extensive examples, including numerical, and exercises. MR

**Applications (Engineering), T(18: 2), S. Variational Principles of Continuum Mechanics with Engineering Applications, Volume 1: Critical Points Theory.** Vadim Komkov. Math. & Its Applic. D Reidel, 1986, viii + 387 pp, \$59. [ISBN: 90-277-2157-2] New approach to "old" theory of variational methods normally taught in mathematical methods course. Primarily focuses on critical point theory and its applications to continuum mechanics. Attempts to incorporate modern functional analysis into standard engineering problems such as elastic stability. Many excellent examples and problems interspersed in text to illustrate techniques. MR

**Applications (Linguistics), P. Foundations and Applications of Montague Grammar, Part 1: Philosophy, Framework, Computer Science.** T.M.V. Janssen. CWI Tract V. 19. Math Centrum, 1986, iv + 205 pp, Dfl. 31.30 (P). [ISBN: 90-6196-292-7] Based on author's dissertation. Each chapter starts with an abstract. Chapters on the principle of compositionality of meaning, the algebraic framework for the study, intensional logic. Montague grammar and programming languages. Appendix; index of names; references. RJA

**Applications (Physics), P. Proceedings Seminar 1983-1985: Mathematical Structures in Field Theories, V. 1, Geometric Quantization.** G.M. Tuynman. CWI Syllabus, V. 8. Math Centrum, 1985, iii + 158 pp, Dfl. 22.70 (P). [ISBN: 90-6196-293-5] The notes for the author's lectures which were part of the

1983-85 seminar held at the Centrum voor Wiskunde en Informatica in Amsterdam. Emphasizes thorough coverage, with proofs, of parts of geometric quantization theory. JAS

**Applications (Physics), T(16-18: 1, 2), S, P.** *A Course in Mathematical Physics, V. 2: Classical Field Theory, Second Edition.* Walter Thirring. Transl: Evans M. Harrell. Springer-Verlag, 1986, x + 261 pp, \$35. [ISBN: 0-387-96266-2] In addition to correcting minor mistakes in the original edition, this version contains a section on gauge theories. The mathematical language, differential geometry, remains unchanged. MU

**Applications (Physics), T(16-18: 1), S, L.** *An Introduction to Twistor Theory.* S.A. Huggett, K.P. Tod. London Math. Soc. Stud. Texts, V. 4. Cambridge U Pr, 1985, 145 pp, \$13.95 (P). [ISBN: 0-521-31361-9] This introduction to twistor theory and modern geometrical approaches to space-time structure evolved from graduate lectures given in London and Oxford. Topics include: spinor algebra, compactified Minkowski space, the geometries of null congruences and twistor space, sheaf cohomology, the active twistor constructions which solve the self-dual Yang-Mills and Einstein equations, and Penrose's quasi-local-mass construction. MU

**Applications (Physics), S(18), P.** *Ill-posed Problems of Mathematical Physics and Analysis.* M.M. Lavrent'ev, V.G. Romanov, S.P. Shishatskii. Transl. of Math. Mono., V. 64. AMS, 1986, vi + 290 pp, \$98. [ISBN: 0-8218-4517-9] Problems, ill-posed in the Hadamard sense, arising from the interpretation of geophysical data, are considered in the context of advanced applied mathematics. The authors attempt to fill the following gaps in the current literature: ill-posed problems for concrete types of differential equations, problems of analytic continuation, inverse problems for differential equations, and problems of integral geometry. MU

**Applications (Physics), P.** *Current Algebra and Anomalies.* Sam B. Treiman, et al. Ser. in Physics. Princeton U Pr, 1985, xi + 537 pp, \$54; \$26 (P). [ISBN: 0-691-08397-5; 0-691-08398-3] Current algebras are used in the analysis of fundamental particle interactions. Contains surveys on current algebra and anomalies derived in part from lectures given at the Brookhaven Summer School in Theoretical Physics in 1970, and lectures given at the 1983 Les Houches Summer School. AM

**Applications (Physics), P.** *Dynamical Problems in Continuum Physics.* Ed: J.L. Bona, et al. IMA, V. 4. Springer-Verlag, 1987, xii + 321 pp, \$28. [ISBN: 0-387-96463-0] Sixteen contributions to the 1984-85 IMA program in Minnesota on nonlinear behavior of matter and waves, such as fluid jet instabil-

ity, piezoelectricity, and acoustic waves in (stressed) elastic materials. BC

**Applications (Physics), P.** *Wave Propagation and Scattering.* Ed: B.J. Uscinski. Inst. of Math. & Its Applic., Conf. Ser., V. 5. Clarendon Pr, 1986, x + 381 pp, \$59. [ISBN: 0-19-853607-0] A collection of papers presented at the University of Cambridge in April 1984. MU

**Applications (Physics), S(18), P.** *Essays on Supersymmetry.* Ed: C. Fronsdal, et al. Math. Phy. Stud., V. 8. D Reidel, 1986, x + 270 pp, \$54.95. [ISBN: 90-277-2207-2] Organized into four sections: "Unitary Representations of Supergroups," a study of unitarizable representations of noncompact superalgebras; "3 + 2 de Sitter Superfields," examining the reduction of de Sitter superfields into irreducible representations of  $osp(4/1)$ ; "Spontaneously Generated Field Theories, Zero-center Modules, Colored Singletons and the Virtues of  $N = 6$  Supergravity," which is devoted to electrodynamics; and "Massless Particles, Orthosymplectic Symmetry and Another Type of Kaluza-Klein Theory," which was inspired by twistor theory. MU

**Applications (Physics), S(18), P.** *Homogenization and Effective Moduli of Materials and Media.* Ed: J.L. Ericksen, et al. IMA Vol. in Math. & Its Applic., V. 1. Springer-Verlag, 1986, x + 263 pp, \$22.50. [ISBN: 0-387-96306-5] A collection of papers presented at a workshop on homogenization of differential equations and the determination of effective moduli of materials and media, primarily in the context of continuum theory. Applications include elastic and dielectric responses of composites, and the effective properties of shales and soils. MU

**Applications (Physics), P.** *Supersymmetry and Its Applications: Superstrings, Anomalies, and Supergravity.* Ed: G.W. Gibbons, S.W. Hawking, P.K. Townsend. Cambridge U Pr, 1986, xiv + 481 pp, \$49.50. [ISBN: 0-521-30721-X] In physical terms, supersymmetry is a system which describes the symmetry of bosons (particles with integer spin), and fermions (particles with half integer spin) within a unified framework. Contains the proceedings of the workshop on supersymmetry and its applications which took place in the department of applied mathematics and theoretical physics of Cambridge University, June 23-July 14, 1985. AM

**Applications (Physics), P.** *Computational Methods for Kinetic Models of Magnetically Confined Plasmas.* J. Killeen, et al. Ser. in Computat. Physics. Springer-Verlag, 1986, viii + 199 pp, \$38. [ISBN: 0-387-13401-8] Applied kinetic theory can be used to develop computer simulations of magnetically confined plasmas. In particular, kinetic models based on the Boltzmann equation with Fokker-Planck collision terms have been successful in rep-

representing plasma behavior. Describes a number of Fokker-Planck computational models developed over the last decade. AM

**Applications (Physics), P.** *Generalized Coherent States and Their Applications*. A. Perelomov. Texts & Mono. in Physics. Springer-Verlag, 1986, xi + 320 pp, \$65. [ISBN: 0-387-15912-6] Coherent states arise in quantum mechanics. The standard coherent states describe nonspreading wave packets for the harmonic oscillator. This book explores the relation between the standard coherent states system and the Heisenberg-Weyl group. This relationship generalizes the notion of coherent states systems to other Lie groups. These systems are then applied to a variety of physical problems. AM

**Applications (Physics), P\*\*\*.** *Quantum Mechanics from General Relativity: An Approximation for a Theory of Inertia*. Mendel Sachs. Fund. Theo. of Physics. D Reidel, 1986, xvi + 227 pp, \$69. [ISBN: 90-277-2247-1] Proposes a new theory of matter in opposition to the Copenhagen school. Assuming Einstein's general relativity, a new quantum mechanics is shown to follow as a linear approximation of inertia. Makes new relativistic and non-relativistic predictions. Demonstrates logical incompatibility of special relativity and old quantum mechanics. Proves an equivalent of Pauli Exclusion Principle. Philosophical tenets and ramifications thoroughly discussed. Very interesting. MR

**Applications (Physics), S(18).** *Relativistic Electrodynamics and Differential Geometry*. Stephen Parrott. Springer-Verlag, 1987, xi + 308 pp, \$48. [ISBN: 0-387-96435-5] Mathematical formulation of classical relativistic electrodynamics (i.e., no general relativity). Addresses problem of choice of Lorentz-Dirac equation to govern motion of charged particle. Assumes differential geometry, basic electrodynamics and special relativity. Good book for mathematicians. MR

**Applications (Physics), P.** *Unification and Supersymmetry: The Frontiers of Quark-Lepton Physics*. Rabindra N. Mohapatra. Contemp. Physics. Springer-Verlag, 1986, xii + 309 pp, \$34. [ISBN: 0-387-96285-9] This book traces the development of theoretical models of elementary particle interactions. Based on a graduate course offered at CCNY; assumes as prerequisites knowledge of quantum field theory, the theory of Lie groups, basic particle theory, and familiarity with spontaneously broken gauge theories. AM

**Applications (Physics), P.** *Computer Simulation in Physical Metallurgy*. Ed: Gianni Jacucci. D Reidel, 1986, viii + 311 pp, \$58. [ISBN: 90-277-2192-0] Lectures from a May 1984 conference held in Ispra, Italy on mathematical and computer models of

solids—fractures, surface effects, flows and plasticity, etc. LAS

**Applications (Physics), T(16-17: 1).** *A Concept of Mathematical Physics: Models in Mechanics*. Tamás Matolcsi. Akademiai Kiado, 1986, 335 pp, \$34. [ISBN: 963-05-3627-7] Introduces the topics of classical mechanics, quantum mechanics, special relativity, and field theory together with the appropriate mathematical background from probability, functional analysis, symplectic geometry, and group representations. Emphasizes the notion of relativity—the idea that a physical theory must establish a rule connecting measurements made by observers with absolute objects. AM

**Applications (Physics), P.** *Rotations, Quaternions, and Double Groups*. Simon L. Altmann. Clarendon Pr, 1986, 317 pp, \$49. [ISBN: 0-19-855372-2] Written for an audience such as molecular and solid-state theorists, and crystallographers. Considers rotations from geometric and quaternionic viewpoint and avoids Lie group theory. LC

**Applications (Physics), P.** *Lecture Notes in Mathematics-1174: Categories in Continuum Physics*. Ed: F.W. Lawvere, S.H. Schanuel. Springer-Verlag, 1986, 126 pp, \$11.60 (P). [ISBN: 0-387-16096-5] Proceedings of a 1982 conference held at SUNY at Buffalo in May 1982 which presents some efforts to find better categories of geometrical objects for physics. JAS

**Applications (Physics), P.** *Hamiltonian Structure and Lyapunov Stability for Ideal Continuum Dynamics*. D.D. Holm, J.E. Marsden, T.S. Ratiu. Pr U Montreal, 1986, 208 pp, \$20 (P). [ISBN: 2-7606-0771-2] Two long papers on mathematical physics; lecture notes from an August 1985 NATO seminar on nonlinear dynamical systems, held at the University of Montreal. PZ

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