



Telegraphic Reviews

Arnold Ostebee

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TELEGRAPHIC REVIEWS

Edited by **Arnold Ostebee**

with the assistance of the Mathematics Departments of
Carleton, Macalester, and St. Olaf Colleges

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

<i>T</i> : Textbook	<i>P</i> : Professional Reading	1–4: Semester
<i>C</i> : Computer Software	<i>L</i> : Undergraduate Library	** : Special Emphasis
<i>S</i> : Supplementary Reading	13: Grade Level	?? : Questionable

Readers are advised that price information is subject to change. Selected books receive a second, more extensive review in the *Monthly*.

Books submitted for review should be sent to *Book Reviews Editor, American Mathematical Monthly, St. Olaf College, 1520 St. Olaf Avenue, Northfield, MN 55057-1098.*

General, L. *You Can't Get Lost On a Golf Course.* Francis Scheid. Jones River Pr (Plymouth, MA 02360), 1998, x + 158 pp, \$16.95 (P). [ISBN 1-888964-03-0] Fictional dialogs between 'student' and 'professor' on golf with mathematical digressions. Golf course topology is mostly graph theoretic. SN

General, P. *Spectral Problems in Geometry and Arithmetic.* Ed: Thomas Branson. *Contemp. Math.*, V., 237. AMS, 1999, xi + 174 pp, \$37 (P). [ISBN 0-8218-0940-7] Proceedings of a 1997 NSF-CBMS conference at the University of Iowa.

General, P. *Proceedings of the St. Petersburg Mathematical Society, Volume V.* Ed: N.N. Uraltseva. AMS Transl., Ser. 2, V. 193. AMS, 1999, vii + 271 pp, \$99. [ISBN 0-8218-1390-0]

Education, P. *Mathematics in the Middle.* Ed: Larry Leutzing. NCTM, 1998, vi + 218 pp, \$26 (P). [ISBN 0-87353-460-3] 28 papers outline issues, present *Standards*-based curricula, and describe projects and activities for middle-grades classrooms.

Logic, P. *Truth, Proof and Infinity: A Theory of Constructions and Constructive Reasoning.* Peter Fletcher. Synthese Library, V. 276. Kluwer Academic, 1998, ix + 469 pp, \$157. [ISBN 0-7923-5262-9] Develops precise definitions of construction and proof in constructive mathematics, and describes algorithmic underpinnings of intuitionist logic. For logicians, philosophers of mathematics, theoretical computer scientists. LB

Logic, P. *Advances in Contemporary Logic and Computer Science.* Eds: Walter A. Carnielli,

Itala M.L. D'Ottaviano. *Contemp. Math.*, V. 235. AMS, 1999, xi + 326 pp, \$60 (P). [ISBN 0-8218-1364-1] Proceedings of the Eleventh Brazilian Conference on Mathematical Logic held in 1996 in Salvador, Bahia, Brazil.

Combinatorics, P, L. *Graph Classes: A Survey.* Andreas Brandstädt, Van Bang Le, Jeremy P. Spinrad. *Mono. on Disc. Math. & Applic.* SIAM, 1999, xi + 304 pp, \$68 (P). [ISBN 0-89871-432-X] Survey of over 200 graph classes with emphasis on algorithmic point of view; results given without proof. A distillation of over a thousand cited references. SN

Number Theory, P. *Topics in Number Theory: In Honor of B. Gordon and S. Chowla.* Eds: Scott D. Ahlgren, George E. Andrews, Ken Ono. *Math. & Its Applic.*, V. 467. Kluwer Academic, 1999, viii + 258 pp, \$120. [ISBN 0-7923-5583-0] Papers from a 1997 conference at the Pennsylvania State University.

Number Theory, P. *Automorphic Forms, Automorphic Representations, and Arithmetic.* Eds: Robert S. Doran, Ze-Li Dou, George T. Gilbert. *Proc. of Symposia in Pure Math.*, V. 66. AMS, 1999, \$121 set, [ISBN 0-8218-0659-9] set. *Part 1*, xi + 278 pp; *Part 2*, xi + 330 pp. Proceedings of the NSF-CBMS Regional Conference on Euler Products and Eisenstein Series held at Texas Christian University in 1996.

Linear Algebra, T(16–17), P. *Orthogonal Sets and Polar Methods in Linear Algebra: Applications to Matrix Calculations, Systems of Equations, Inequalities, and Linear Programming.* Enrique Castillo, et al. *Pure & Appl. Math. Wi-*

ley, 1999, xii + 422 pp, \$89.95. [ISBN 0-471-32889-8] Presents methods for solving a variety of linear algebra problems based on properties of orthogonal sets and dual cones. AO

Group Theory, T(18), P. *Completely Regular Semigroups*. Mario Petrich, Norman R. Reilly. Canadian Math. Soc. Ser. of Mono. & Adv. Texts, V. 23. Wiley, 1999, x + 481 pp, \$115. [ISBN 0-471-19571-5]

Calculus, S(14), C. *Multivariable Calculus and Mathematics: With Applications to Geometry and Physics*. Kevin R. Coombes, Ronald L. Lipsman, Jonathan M. Rosenberg. Springer-Verlag, 1998, xiii + 283 pp, \$34.95 (P), with disk. [ISBN 0-387-98360-0] Some chapters discuss standard material from an unusual point of view; others present topics that are difficult to address without a computer. Physical applications (e.g., Kepler's laws, electromagnetism, fluid flow) and elementary ideas from differential geometry play a prominent role. Exercises exploit the graphical, symbolic, and numerical capabilities of *Mathematica*. Presumes familiarity with *Mathematica* basics. AO

Calculus, T(13: 2), C. *Calculus: The Language of Change, Second Edition*. Keith D. Stroyan. Academic Pr, 1998, xix + 555 pp, with CD-ROM. [ISBN 0-12-673030-X]; *Projects for Calculus: The Language of Change, Second Edition*, 1999, xii + 326 pp, (P). [ISBN 0-12-673031-8] *First Edition* was entitled *Calculus Using Mathematica* (TR, February 1994). Text now accommodates use of either Maple or Mathematica. *Projects* book contains 52 open-ended projects on applications in mathematics, economics, science, and engineering. CD-ROM includes Mathematica Notebooks and Maple Worksheets as well as optional material not in the printed text. AO

Calculus, T(13: 2). *Calculus: Applications and Technology For Business, Social and Life Sciences, Second Edition*. Edmond C. Tomastik. Saunders College, 1999, xxiv + 533 pp, \$48 (P). [ISBN 0-03-021559-5] Based on the author's text *Applied Calculus With Technology*. This edition adds material on modeling using regression analysis, includes more referenced (i.e., "real life") examples and exercises, and places greater emphasis on the use of technology. AO

Complex Analysis, P. *Convex and Starlike Mappings in Several Complex Variables*. Sheng Gong. Math. & Its Applic., V. 435. Kluwer Academic, 1998, xiii + 199 pp, \$89. [ISBN 0-7923-4964-4]

Partial Differential Equations, P. *Global Solutions of Nonlinear Schrödinger Equations*. J.

Bourgain. Colloquium Pub., V. 46. AMS, 1999, viii + 182 pp, \$35. [ISBN 0-8218-1919-4]

Partial Differential Equations, T(17-18). *Linear and Nonlinear Waves*. G.B. Whitham. Pure & Appl. Math. Wiley, 1999, xvi + 636 pp, \$64.95 (P). [ISBN 0-471-35942-4] Paperback edition of 1974 text (TR, February 1975).

Partial Differential Equations, T(15-17). *Numerical Solution of Partial Differential Equations in Science and Engineering*. Leon Lapidus, George F. Pinder. Wiley, 1999, xiv + 677 pp, (P). [ISBN 0-471-35944-0] Paperback edition of 1982 text (TR, January 1983).

Partial Differential Equations, T(17-18). *Numerical Partial Differential Equations: Conservation Laws and Elliptic Equations*. J.W. Thomas. Texts in Appl. Math., V. 33. Springer-Verlag, 1999, xxii + 556 pp, \$59.95. [ISBN 0-387-98346-5] From the Preface: "... includes stability results for difference schemes for solving initial-boundary-value problems, analytic and numerical results for both scalar and systems of conservation laws, numerical methods for elliptic equations and an introduction to methods for irregularly shaped regions and for computation problems that need grid refinements."

Operator Theory, P. *Singular Quadratic Forms in Perturbation Theory*. Volodymyr Koshmanenko. Math. & Its Applic., V. 474. Kluwer Academic, 1999, viii + 308 pp, \$165. [ISBN 0-7923-5625-X]

Analysis, P. *Continued Fractions: From Analytic Number Theory to Constructive Approximation*. Eds: Bruce C. Berndt, Fritz Gesztesy. Contemp. Math., V. 236. AMS, 1999, xviii + 379 pp, \$78 (P). [ISBN 0-8218-1200-9] Proceedings of a 1998 conference held at the University of Missouri-Columbia.

Topology, P. *Low Dimensional Topology*. Ed: Hanna Nencka. Contemp. Math., V. 233. AMS, 1999, xi + 249 pp, \$56 (P). [ISBN 0-8218-0884-2] Proceedings of a 1998 conference held in Funchal, Madeira, Portugal.

Optimization, T(17), P. *Network Optimization: Continuous and Discrete Models*. Dimitri P. Bertsekas. Athena Scientific, 1998, xiii + 593 pp, \$74. [ISBN 1-886529-02-7] Introductory treatment of linear, nonlinear, and discrete network optimization problems. Theoretical results, algorithms, and applications. AO

Optimization, T(17-18), P. *Integer and Combinatorial Optimization*. George Nemhauser, Laurence Wolsey. Ser. in Disc. Math. & Optim. Wiley, 1999, xiv + 763 pp, \$74.95 (P).

[ISBN 0-471-35943-2] Paperback edition of 1988 text (TR, February 1989).

Optimization, T(17-18), P. *Iterative Methods for Optimization*. C.T. Kelley. Frontiers in Appl. Math. SIAM, 1999, xv + 180 pp, \$37 (P). [ISBN 0-89871-433-8] Introduction to numerical methods for unconstrained and bound-constrained optimization problems. Focuses on a few methods that convey essential ideas. Discusses deterministic sampling algorithms (e.g., Hooke-Jeeves, implicit filtering, MDS) as well as gradient-based techniques. AO

Game Theory, P. *Avances en Teoría de Juegos con Aplicaciones Económicas Y Sociales*. Eds: J.M. Bilbao, F.R. Fernández. Universidad de Sevilla (Porvenir, 27-41013 Sevilla, Spain), 1999, ix + 254 pp, (P). [ISBN 84-472-0517-7]

Mathematical Modeling, T(15-17). *Mathematical Modeling, Second Edition*. Mark M. Meerschaert. Academic Pr, 1999, xvi + 351 pp. [ISBN 0-12-487652-8] New sections on discrete modeling (including integer programming) and on chaos and fractals. Three parts discuss optimization models, dynamical models, and probability models. (First Edition, TR, December 1993.) AO

Optimal Control, P. *Nonlinear Analysis, Differential Equations and Control*. Eds: F.H. Clarke, R.J. Stern. NATO Sci. Ser. C, V. 528. Kluwer Academic, 1999, xix + 602 pp, \$297. [ISBN 0-7923-5665-9] Proceedings of a 1998 NATO Advanced Study Institute held in Montréal, Canada.

Optimal Control, T(16-17: 1, 2), S, P. *Fuzzy Control of Industrial Systems: Theory and Applications*. Ian S. Shaw. Kluwer Academic, 1998, xxiii + 192 pp, \$115. [ISBN 0-7923-8249-8] Includes background on fuzzy sets and fuzzy logic, but assumes familiarity with linear continuous and discrete systems, feedback, basic control theory. Covers fuzzy controllers, rule-based systems, stability analysis, neurofuzzy controllers, practical development issues, collaborative control systems (fuzzy controller plus human operator). No exercises in text, but questions over each chapter are available on request from the author. LB

Stochastic Processes, P. *Advances in Stochastic Inequalities*. Eds: Theodore P. Hill, Christian Houdré. Contemp. Math., V. 234. AMS, 1999, ix + 212 pp, \$45 (P). [ISBN 0-8218-1086-3] Papers from a Special Session at the AMS meeting held at the Georgia Institute of Technology in 1997.

Stochastic Processes, T(16-17), P. *Stochastic Processes*. Emanuel Parzen. Classics in

Appl. Math., V. 24. SIAM, 1999, xix + 324 pp, \$37 (P). [ISBN 0-89871-441-9] Unabridged, corrected republication. Originally published in 1962 by Holden-Day.

Stochastic Processes, P. *Limit Theorems for Random Fields with Singular Spectrum*. Nikolai Leonenko. Math. & Its Applic., V. 465. Kluwer Academic, 1999, viii + 401 pp, \$192. [ISBN 0-7923-5635-7]

Elementary Statistics, T(13: 1), C. *Statistics: An Introduction, Fifth Edition*. Robert D. Mason, Douglas A. Lind, William G. Marchal. Duxbury Pr, 1998, xxii + 689 pp, \$79.95, with disk. [ISBN 0-534-35379-7] Added in this edition: Excel spreadsheet examples, a chapter on quality control, and a section on box plots. (Fourth Edition, TR, November 1994.) KB

Elementary Statistics, T(14: 1). *Applied Statistics and Probability for Engineers, Second Edition*. Douglas C. Montgomery, George C. Runger. Wiley, 1999, xiv + 917 pp, \$103.95. [ISBN 0-471-17027-5] Stresses methodology and applications rather than mathematical theory. Uses output from modern statistical software in examples. All text data are available in electronic form. HS

Statistical Methods, T(17-18: 1), P, L. *Model Selection and Inference: A Practical Information-Theoretic Approach*. Kenneth P. Burnham, David R. Anderson. Springer-Verlag, 1998, xx + 353 pp, \$69.95. [ISBN 0-387-98504-2] Introduction to analysis of empirical data using information-theoretic approaches. Presents a consistent methodology that treats model formulation, model selection, estimation of model parameters, and their uncertainty in a unified manner. Reviews other information criteria (e.g., AIC_c, QAIC, TIC) and presents several new approaches to estimating model selection uncertainty and incorporating this uncertainty into estimates of precision. Examples (primarily ecological) illustrate technical issues. KB

Statistical Methods, S(15-17), P. *Selecting and Ordering Populations: A New Statistical Methodology*. Jean Dickinson Gibbons, Ingram Olkin, Milton Sobel. Classics in Appl. Math., V. 26. SIAM, 1999, xxv + 569 pp, \$59.50 (P). [ISBN 0-89871-439-7] Unabridged, corrected republication. (1977 Wiley edition, TR, April 1978.)

Statistical Methods, T(18), P. *Fractional Factorial Plans*. Alope Dey, Rahul Mukerjee. Ser. in Prob. & Stat. Wiley, 1999, xii + 211 pp, \$84.95. [ISBN 0-471-29414-4]

Statistics, S(18), P. *Geostatistics: Modeling*

Spatial Uncertainty. Jean-Paul Chilès, Pierre Delfiner. Ser. in Prob. & Stat. Wiley, 1999, xi + 695 pp, \$125. [ISBN 0-471-08315-1]

Theory of Computation, T(15-17: 1), S, P. *Term Rewriting and All That*. Franz Baader, Tobias Nipkow. Cambridge Univ Pr, 1998, xii + 301 pp, \$49.95. [ISBN 0-521-45520-0] Discusses a branch of theoretical computer science based on equational logic which uses equations as directed replacement rules. Requires only basic discrete math background. Applications to algebra (word problem), software engineering, recursion theory, functional and logic programming. LB

Applications (Economics), P. *Financial Markets: Stochastic Analysis and the Pricing of Derivative Securities*. A.V. Mel'nikov. Transl. of Math. Mono., V. 184. AMS, 1999, xiv + 133 pp, \$49. [ISBN 0-8218-1082-0]

Applications (Social Science), S(16-17), P, L. *Evaluation and Optimization of Electoral Systems*. Pietro Grilli di Cortona, et al. Mono. on Disc. Math. & Applic. SIAM, 1999, xvi + 230 pp, \$53 (P). [ISBN 0-89871-422-2] Presents a quantitative approach to the study of electoral systems based on single- and multiple-criteria optimization methods. Also discusses automatic procedures for designing electoral districts. Includes reflections on the political aspects of election reform that provide perspective on the benefits and the limits of using mathematical models to design electoral systems. AO

Applications (Systems Theory), T(16-18), P. *Classical Control Using H^∞ Methods: Theory, Optimization, and Design*. J. William Helton, Orlando Merino. SIAM, 1998, xvi + 292 pp, \$45 (P). [ISBN 0-89871-419-2] Parts I-II provide an introduction to control systems design; Parts III-V develop a theory for frequency domain CAD. Assumes reader has some background in control theory (e.g., from a one-semester introductory course).

Applications (Systems Theory), S(16-18). *Classical Control Using H^∞ Methods: An Introduction to Design*. J. William Helton, Orlando Merino. SIAM, 1998, xii + 171 pp, \$18.50 (P). [ISBN 0-89871-424-9] Contains the design portions of the author's text *Classical Control Using H^∞ Methods: Theory, Optimization, and Design*. (See preceding review.)

Applications (Systems Theory), T(18), P. *Indefinite-Quadratic Estimation and Control: A Unified Approach to H^2 and H^∞ Theories*. Babak Hassibi, Ali H. Sayed, Thomas Kailath. Stud. in Appl. & Num. Math., V. 16. SIAM, 1999, xvii + 555 pp, \$80. [ISBN 0-89871-411-7]

Applications (Systems Theory), P. *Lecture*

Notes in Control and Information Sciences-245: Robustness in Identification and Control. Eds: Andrea Garulli, Alberto Tesi, Antonio Vicino. Springer-Verlag, 1999, xiv + 467 pp, \$105 (P). [ISBN 1-85233-179-8] Papers, many in a tutorial style, from a 1998 workshop held in Siena, Italy.

Applications (Systems Theory), P. *Lecture Notes in Control and Information Sciences-243: Progress in System and Robot Analysis and Control Design*. Eds: S.G. Tzafestas, G. Schmidt. Springer-Verlag, 1999, xxvii + 588 pp, \$125 (P). [ISBN 1-85233-123-2] Papers from the Third European Robotics, Intelligent Systems, and Control Conference (EURISCON '98) held in Athens, Greece.

Applications (Systems Theory), P. *Lecture Notes in Control and Information Sciences-244: New Directions in Nonlinear Observer Design*. Eds: H. Nijmeijer, T.I. Fossen. Springer-Verlag, 1999, xix + 525 pp, \$119 (P). [ISBN 1-85233-134-8] Papers from a 1999 workshop held in Geiranger Fjord, Norway.

Applications, T(16-17: 1), L. *NURBS: From Projective Geometry to Practical Use, Second Edition*. Gerald E. Farin. AK Peters, 1999, xv + 267 pp, \$44. [ISBN 1-56881-084-9] NURBS (Non-Uniform Rational B-Splines) are widely used for describing objects in CAD/CAM and computer graphics applications. Text develops concepts and algorithms for describing curves and surfaces using NURBS. *Second Edition* incorporates recent research results and a new chapter on Pythagorean curves (*First Edition*, TR, November 1995). AO

Applications, P, L. *Computation, Causation, and Discovery*. Eds: Clark Glymour, Gregory F. Cooper. MIT Pr, 1999, xvi + 552 pp, \$45 (P). [ISBN 0-262-57124-2] A collection of papers on data mining for causal relationships. (For example, to answer the question "Does an intervention that directly affects one part of a system indirectly alter another part?") In five parts: Causation, Representation and Prediction; Search; Controversy Over Search; Estimating Causal Effects; Scientific Applications.

Applications, P. *Modern Mathematical, Management, & Statistical Sciences, I*. Eds: Edward J. Dudewicz, Bruce L. Golden, Z. Govindarajulu. Amer. J. of Math. & Manag. Sci., V. 18, Nos. 3 & 4. American Sciences Pr, 1998, 189 pp, \$195 (P). [ISBN 0-935950-45-1]

Reviewers

KB: Karla Ballman, Macalester; LB: Lynne Baur, Carleton; SN: Sam Northshield, Carleton; AO: Arnold Ostebee, St. Olaf; HS: Heidi Shierholz, St. Olaf.