



Telegraphic Reviews

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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.*

Reference, P. *Encyclopedia of Statistical Sciences, Update Volume 3.* Ed: Samuel Kotz, et al. Wiley, 1999, xvii + 898 pp, \$215. [ISBN 0-471-23883-X]

Education, P, L. *Making Change in Mathematics Education: Learning from the Field.* Eds: Joan Ferrini-Mundy, et al. NCTM, 1998, xii + 148 pp, \$10.95 (P). [ISBN 0-87353-442-5] Profiles of pioneers who embarked early on implementation of the 1989 NCTM *Standards* based on a qualitative research study undertaken by NCTM at seventeen different sites. Some conclusions: change is challenging; teachers need space to experiment; no single approach fits all circumstances. Unfortunately, many teachers miss the mathematical point of the *Standards*, so some results are more caricatures than implementation. LAS

Education, P*, L*. *Developing Mathematically Promising Students.* Ed: Linda Jensen Sheffield. NCTM, 1999, xii + 316 pp, \$37.50 (P). [ISBN 0-87353-470-0] A rich and varied resource for teachers struggling to challenge the ablest students even as they provide a common core curriculum for all students. 34 papers on identification of promising students (are others thus "unpromising?"), on developing cultures of mathematics and opportunity, and on examples of programs and approaches that work. LAS

Education, P. *Challenges in the Mathematics Education of African American Children.* Eds: Carol E. Malloy, Laura Brader-Araje. NCTM, 1998, ix + 85 pp, \$9.95 (P). [ISBN 0-87353-

458-1] Proceedings of the 1997 Benjamin Banneker Association Leadership Conference.

Education, P. *Elementary School Mathematics: What Parents Should Know About Problem Solving/Estimation, Second Edition.* Barbara J. Reys. NCTM, 1999, \$6 (P). [ISBN 0-87353-467-0]

Education, P. *Changing the Faces of Mathematics: Perspectives on Latinos.* Eds: Walter G. Secada, et al. NCTM, 1999, viii + 168 pp, \$16 (P). [ISBN 0-87353-464-6] First in a planned series of six volumes focused on issues related to the teaching and learning of mathematics among ethnic minorities and women. Five sections: Socioeducational Issues; Language Issues; Teaching-Learning Aids; Staff Development; Intervention Programs.

Logic, T(15-17: 1), L. *A Set Theory Workbook.* Iain T. Adamson. Birkhäuser Boston, 1998, viii + 154 pp, \$29.50 (P). [ISBN 0-8176-4028-2] Text for an introductory set theory course using the Moore method. Presents definitions and notation; 155 exercises cover examples and theorems. Includes hints and complete solutions for exercises. Follows Von Neumann-Bernays-Gödel approach. KES

Logic, T*(17: 1, 2), L. *Logic of Mathematics: A Modern Course of Classical Logic.* Zofia Adamowicz, Paweł Zbierski. Pure & Appl. Math. Wiley, 1997, viii + 260 pp, \$59.95. [ISBN 0-471-06026-7] Concise and clear. Part I contains introduction to logic and model theory; emphasizes relational structures. Part II covers Gödel's incompleteness theorems,

Tarski's theorem on real closed fields, Matiyasevich's theorem on diophantine relations. KES
Logic, P. *Provability, Complexity, Grammars.* Lev Beklemishev, Mati Pentus, Nikolai Vereshchagin. AMS Transl. Ser. 2, V. 192. AMS, 1999, ix + 172 pp. [ISBN 0-8218-1078-2] Three award-winning dissertations in mathematical logic, mathematical linguistics, and complexity theory.

Foundations, T(13-14: 1), S, L. *Elements of Logic via Numbers and Sets.* D.L. Johnson. Springer-Verlag, 1998, x + 174 pp, \$29.95 (P). [ISBN 3-540-76123-3] Concise, sophisticated text for transition course. (For example, the definition of a field is given on page 4.) Covers types of proof, truth tables, quantifiers, sets, relations, functions, cardinal numbers. Few drill exercises; provides complete solutions for most exercises. KES

Discrete Mathematics, T(17-18: 1), P. *Topics in Intersection Graph Theory.* Terry A. McKee, F.R. McMorris. SIAM, 1999, viii + 205 pp, \$55 (P). [ISBN 0-89871-430-3] The intersection graph of a family of sets is the graph in which the sets are the vertices, and two vertices are adjacent if the corresponding sets have nonempty intersection. Covers theory and techniques common to various types of intersection graphs. Emphasizes chordal, interval, and competition graphs. Includes guide to literature for related topics, exercises, extensive bibliography, applications. KES

Algebra, P. *The Classification of the Finite Simple Groups, Number 4, Part II, Chapters 1-4: Uniqueness Theorems.* Daniel Gorenstein, Richard Lyons, Ronald Solomon. Math. Surv. & Mono., V. 40, No. 4. AMS, 1999, xv + 341 pp, \$75. [ISBN 0-8218-1379-X]

Algebra, T(15-16: 1, 2), L. *Algebra: Abstract and Concrete.* Frederick M. Goodman. Prentice-Hall, 1998, xv + 335 pp. [ISBN 0-13-283988-1] Text for first or second abstract algebra course. Presents groups first. Includes group actions, field extensions, solvability, isometry groups. Emphasis on symmetry. Prerequisite: first course in linear algebra. KES

Real Analysis, T(16-17: 1, 2). *Principles of Real Analysis, Third Edition.* Charalambos D. Aliprantis, Owen Burkinshaw. Academic Pr, 1998, x + 415 pp. [ISBN 0-12-050257-7] Besides the basics, covers measurability, Lebesgue integral, Stone-Weierstrass theorem, normed spaces, L_p -spaces, Hilbert spaces, and Fourier analysis (new in this edition). (*Second Edition*, TR, December 1990.) SN

Real Analysis, S(16-17). *Problems in Real*

Analysis, Second Edition: A Workbook with Solutions. Charalambos D. Aliprantis, Owen Burkinshaw. Academic Pr, 1999, vii + 403 pp. [ISBN 0-12-050257-7] Detailed solutions to all 609 problems in the authors' *Principles of Real Analysis, Third Edition.* (See preceding review.) SN

Real Analysis, T(17: 2, 3), L. *Real Analysis: Modern Techniques and Their Applications, Second Edition.* Gerald B. Folland. Pure & Appl. Math. Wiley, 1999, xiv + 386 pp, \$74.95. [ISBN 0-471-31716-0] *Second Edition* of popular text. New features include: expanded sections on n -dimensional Lebesgue integral, Fourier analysis and distributions; added material on self-similarity and Hausdorff dimension; new proof of Tychonoff's theorem. (*First Edition*, TR, May 1985.) KS

Complex Analysis, T*(16: 1, 2), L. *Complex Variables.* M. Ya. Antimirov, A.A. Kolyshkin, Rémi Vaillancourt. Academic Pr, 1998, xii + 476 pp. [ISBN 0-12-059545-1] A viable choice for a first course. More formal than some, it has a huge collection of problems. Not much on mappings, but includes an interesting application of residue theory to the evaluation of infinite sums. Worth a look. TAV

Complex Analysis, P. *Positivity in Complex Spaces and Plurisubharmonic Functions.* Pierre Lelong. Papers in Pure & Appl. Math., V. 112. Queen's Univ, 1998, x + 243 pp, (P). [ISBN 088911-828-0] Collects 10 of Lelong's previously published papers.

Partial Differential Equations, T(15: 1), L. *Boundary Value Problems, Fourth Edition.* David L. Powers. Academic Pr, 1999, xi + 528 pp. [ISBN 0-12-563734-9] Major changes since the *Third Edition* (TR, June-July 1987): new sections on applications of Legendre polynomials and the error function; almost 100 new exercises. PG

Numerical Analysis, P, C. *Proceedings of the Ninth SIAM Conference on Parallel Processing for Scientific Computing 1999.* SIAM Activity Group on Supercomputing, 1999, CD-ROM. [ISBN 0-89871-435-4]

Functional Analysis, P. *Function Spaces.* Ed: Krzysztof Jarosz. Contemp. Math., V. 232. AMS, 1999, xvii + 361 pp, \$81 (P). [ISBN 0-8218-0939-3] Proceedings of a conference held at Southern Illinois University in 1998.

Analysis, P. *Positive Solutions of Differential, Difference and Integral Equations.* Ravi P. Agarwal, Donal O'Regan, Patricia J.Y. Wong. Kluwer Academic, 1999, xi + 417 pp, \$210. [ISBN 0-7923-5510-5]

Analysis, P. *Handbook of Splines*. Gheorghe Micula, Sanda Micula. Math. & Its Applic., V. 462. Kluwer Academic, 1999, xvi + 604 pp. [ISBN 0-7923-5503-2] An up-to-date survey of the theory of spline functions and some of their applications. Includes an extensive bibliography (nearly 120 pages!).

Differential Geometry, P. *Moscow Seminar in Mathematical Physics*. Eds: A. Yu. Morozov, M.A. Olshanetsky. AMS Transl. Ser. 2, V. 191. AMS, 1999, x + 299 pp, \$110. [ISBN 0-8218-1388-9] 9 papers based on talks given at the Moscow Institute of Theoretical and Experimental Physics. "The articles are mainly devoted to various aspects of Knizhnik-Zamolodchikov-Bernard connections and integrable models in two-dimensional quantum field theory."

Differential Geometry, P. *Symmetries and Conservation Laws for Differential Equations of Mathematical Physics*. Eds: I.S. Krasil'shchik, A.M. Vinogradov. Transl. of Math. Mono., V. 182. AMS, 1999, xiv + 333 pp, \$129. [ISBN 0-8218-0958-X] Rigorous mathematics and concrete examples illustrate the geometric approach to the study of nonlinear PDEs.

Differential Geometry, P. *Differential and Symplectic Topology of Knots and Curves*. Ed: S. Tabachnikov. AMS Transl., Ser. 2, V. 190. AMS, 1999, x + 286 pp, \$99. [ISBN 0-8218-1354-4]

Differential Geometry, P. *The Topology of Fibre Bundles*. Norman Steenrod. Landmarks in Math. & Physics. Princeton Univ Pr, 1999, viii + 229 pp, \$19.95 (P). [ISBN 0-691-00548-6] Paperback republication of the 1951 edition.

Geometry, T(15-16), S, L. *Conics and Cubics: A Concrete Introduction to Algebraic Curves*. Robert Bix. Undergrad. Texts in Math. Springer-Verlag, 1998, x + 289 pp, \$49.95. [ISBN 0-387-98401-1] A clever book on the algebraic geometry of curves of degree at most 3. Could be used as the textbook for a geometry course for mathematics majors or for a sequel to the usual college geometry course for prospective secondary teachers. PF

Algebraic Topology, P. *Conjugacy Classes in Gauge Groups*. Renzo A. Piccinini, Mauro Spreafico. Papers in Pure & Appl. Math., V. 111. Queen's Univ, 1998, 138 pp, (P). [ISBN 088911-826-4]

Algebraic Topology, S(16), L. *Algebraic Topology: An Intuitive Approach*. Hajime Sato. Transl: Kiki Hudson. Transl. of Math. Mono., V. 183. AMS, 1999, xviii + 118 pp, \$20 (P).

[ISBN 0-8218-1046-4] This translation of a 1996 Japanese monograph provides a gentle introduction to algebraic topology. The author's claim that no previous knowledge of mathematics is necessary is overstated, but the text is reader-friendly (e.g., it concentrates on simple examples at the expense of generalizations). Very few exercises. A nice supplement for a topology course. JD

Topology, P. *Tel Aviv Topology Conference: Rothenberg Festschrift*. Eds: Michael Farber, Wolfgang Lück, Shmuel Weinberger. Contemp. Math., V. 231. AMS, 1999, ix + 320 pp, \$71 (P). [ISBN 0-8218-1362-5] Papers from a 1998 conference at Tel Aviv University.

Topology, P. *Aspects of Ultrametric Spaces*. Ulrich Heckmanns. Papers in Pure & Appl. Math., V. 109. Queen's Univ, 1998, iv + 134 pp, (P). [ISBN 0-88911-822-1]

Topology, T(18), S, P. *Hyperspaces: Fundamentals and Recent Advances*. Alejandro Illanes, Sam B. Nadler, Jr. Pure & Appl. Math., V. 216. Dekker, 1999, xvii + 512 pp, \$175. [ISBN 0-8247-1982-4] First few chapters present the basics of hyperspaces. Remaining chapters detail developments in the 20 years since the second author's *Hyperspaces of Sets* appeared, especially Whitney properties and Whitney-reversible properties. Many examples, exercises, references, and research problems. JD

Topology, P. *Surgery on Compact Manifolds, Second Edition*. C.T.C. Wall. Ed: A.A. Ranicki. Math. Surv. & Mono., V. 69. AMS, 1999, xv + 302 pp, \$59. [ISBN 0-8218-0942-3] This edition supplements the 30-year-old original with notes, footnotes, updated references, and some corrections. (1971 Academic Press *First Edition*, TR, June-July 1971.) JD

Optimization, P. *A Reformulation-Linearization Technique for Solving Discrete and Continuous Nonconvex Problems*. Hanif D. Sherali, Warren P. Adams. Nonconvex Optim. & Its Applic., V. 31. Kluwer Academic, 1999, xxiii + 514 pp, \$252. [ISBN 0-7923-5487-7]

Optimization, P. *Nonlinear Programming and Variational Inequality Problems: A Unified Approach*. Michael Patriksson. Appl. Optim., V. 23. Kluwer Academic, 1999, xiv + 334 pp. [ISBN 0-7923-5455-9]

Stochastic Processes, T, P, L. *Stochastic Processes for Insurance and Finance*. Tomasz Rolski, et al. Ser. in Prob. & Stat. Wiley, 1999, xviii + 654 pp, \$175. [ISBN 0-471-95925-1] An interesting treatment of all the usual topics in a stochastic processes course, from Markov

chains to continuous time martingales, in the context of actuarial and financial considerations of an insurance firm. Written as a text, the price is a hurdle. TAV

Stochastic Processes, P*. *Introduction to Matrix Analytic Methods in Stochastic Modeling*. G. Latouche, V. Ramaswami. Ser. on Stat. & Appl. Prob. SIAM and American Statistical Assoc, 1999, xiv + 334 pp, \$49.50 (P). [ISBN 0-89871-425-7] The matrix analytic method is an important modeling technique because of its wide applicability and numerical tractability. A somewhat daunting treatment, but a valuable addition to the professional literature. Assumes reader has background in advanced calculus, linear algebra, and stochastic processes. TAV

Stochastic Processes, T*(17: 2), P. *Stochastic Dynamic Programming and the Control of Queueing Systems*. Linn I. Sennott. Ser. in Prob. & Stat. Wiley, 1999, xiv + 328 pp, \$79.95. [ISBN 0-471-16120-9] A powerful treatment of stochastic methods in dynamic programming. Each chapter has numerous challenging problems and a detailed bibliography. Assumes a first course in stochastic processes, specifically Markov chains. TAV

Stochastic Processes, P. *Gaussian Measures*. Vladimir I. Bogachev. Math. Surv. & Mono., V. 62. AMS, 1998, xii + 433 pp, \$95. [ISBN 0-8218-1054-5] From the Preface: "The modern theory of Gaussian measures lies at the intersection of the theory of random processes, functional analysis, and mathematical physics, and is closely connected with diverse applications in quantum field theory, statistical physics, financial mathematics, . . ." A rich intersection, indeed. A deep and detailed treatment of an important subject. TAV

Elementary Statistics, T(14: 1). *Statistical Reasoning and Methods*. Richard A. Johnson, Kam-Wah Tsui. Wiley, 1998, xiv + 589 pp, \$86.95. [ISBN 0-471-04205-6] Mathematical level is elementary; stresses reasoning and intuition. Emphasis on quality of data. Includes suggested class projects, exercises, MINITAB commands and output. HS

Statistical Methods, T(16-17: 1). *Time Series Models for Business and Economic Forecasting*. Philip Hans Franses. Cambridge Univ Pr, 1998, x + 280 pp, \$69.95; \$24.95 (P). [ISBN 0-521-58404-3; 0-521-58641-0] Focuses on methodology and applications rather than theory. Assumes knowledge of introductory econometrics. No exercises. HS

Statistical Methods, P. *The Design and Analysis of Clinical Experiments*. Joseph L. Fleiss. Wiley Classics Library. Wiley, 1999, xiv +

432 pp, \$49.95 (P). [ISBN 0-471-34991-7] Paperback republication of the 1986 original.

Statistical Methods, P. *Cognition and Survey Research*. Eds: Monroe G. Sirken, et al. Ser. in Prob. & Stat. Wiley, 1999, xiv + 395 pp, \$89.95. [ISBN 0-471-24138-5] From the Preface: "It [this book] offers a review of the early work in cognition and survey research, an update on the initiatives currently underway, and a glimpse into the future of interdisciplinary work on survey methods."

Statistics, P. *Multivariate Statistical Inference*. Ed: Edward J. Dudewicz. Amer. J. of Math. & Manag. Sci., V. 18, Nos. 1 & 2. American Sciences Pr, 1998, 238 pp, \$148 (P). [ISBN 0-935950-41-9] Volume 4 of the proceedings of the Multivariate Statistical Inference 2000 Conference held in 1995 at the University of Hawaii.

Applications (Economics), P. *Advances in Decision Analysis*. Eds: Nadine Meskens, Marc Roubens. Math. Modelling: Theory & Applic., V. 4. Kluwer Academic, 1999, ix + 202 pp, \$99. [ISBN 0-7923-5563-6] 10 papers from the 1997 International Conference on Methods and Applications of Multiple Criteria Decision Making held in Mons, Belgium.

Applications (Engineering), T(15: 1), L. *Wavelets*. Jöran Bergh, Fredrik Ekstedt, Martin Lindberg. Studentlitteratur, 1999, vii + 210 pp, SEK 355 (P). [ISBN 91-44-00938-0] Signal processing approach to wavelets. First half is devoted to theory, second half to applications. Begins with a review of signal processing and filter banks, then discusses multiresolution analysis and wavelets in several dimensions. PG

Applications (Fluid Mechanics), P. *Annual Review of Fluid Mechanics, Volume 31*. Eds: John L. Lumley, Milton Van Dyke, Helen L. Reed. Annual Reviews, 1999, xi + 650 pp, \$60. [ISBN 0-8243-0731-3]

Applications (Statistical Mechanics), P. *Statistical Green's Functions*. V.I. Yukalov. Papers in Pure & Appl. Math., V. 110. Queen's Univ, 1998, iv + 130 pp, (P). [ISBN 088911-824-8]

Applications (Systems Theory), P. *Generalized Riccati Theory and Robust Control: A Popov Function Approach*. Vlad Ionescu, Cristian Oară, Martin Weiss. Wiley, 1999, xxii + 380 pp, \$125. [ISBN 0-471-97147-2]

Reviewers

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