



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:

T : Textbook	P : Professional Reading	1–4 : Semester
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. 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.*

Precalculus, T(13: 1), C. *Explorations in College Algebra.* Linda Almgren Kime, Judy Clark. Wiley, 1998, xviii + 649 pp, \$73.95 (P), with CD ROM. [ISBN 0-471-10698-4] Designed "to shift the focus from learning a set of discrete mathematical rules to exploring how algebra is used to answer questions about the physical and social world around us." Similar in spirit to other reform texts; reflects NCTM and AMATYC standards.

Precalculus, S(13). *Maths: A Student's Survival Guide.* Jenny Olive. Cambridge Univ Pr, 1998, xiii + 564 pp, \$29.95 (P); \$74.95. [ISBN 0-521-57586-9; 0-521-57306-8] Self-help workbook format; over 800 questions with detailed solutions. Topics range from basic algebra through single-variable calculus. Aimed at science and engineering students.

Foundations, S(14–16: 1), S, P, L. *Explaining Chaos.* Peter Smith. Cambridge Univ Pr, 1998, viii + 193 pp, \$59.95; \$19.95 (P). [ISBN 0-521-471710; 0-521-477476] Philosophical treatment of chaos theory—its foundations, history, and modern role in science. Good, accessible explanations, nice examples, some rigorous mathematical descriptions. RM

Combinatorics, P*, L. *Handbook of Combinatorial Optimization, Volumes 1–3.* Eds: Ding-Zhu Du, Panos M. Pardalos. Kluwer Academic, 1998, \$1325 set, [ISBN 0-7923-5019-7] set. *Volume 1*, viii + 785 pp; *Volume 2*, viii + 753 pp; *Volume 3*, viii + 865 pp. 33 expository articles survey algorithmic approaches to many discrete and combinatorial problems. Most articles are accessible to nonspecialists.

Discrete Mathematics, T(13–14: 1), S, L*. *Mathematical Problems and Proofs: Combinatorics, Number Theory, and Geometry.* Branislav Kisačanin. Plenum Pr, 1998, xiv + 220 pp, \$55. [ISBN 0-306-45967-1] Introduction to basic results and techniques. Emphasizes interesting examples and problems. DB

Number Theory, P. *Random Matrices, Frobenius Eigenvalues, and Monodromy.* Nicholas M. Katz, Peter Sarnak. Colloquium Public., V. 45. AMS, 1999, xi + 419 pp, \$69. [ISBN 0-8218-1017-0] There is empirical evidence that the distribution of the spacings between zeroes of the zeta-function is the same as a certain probability measure from random matrix theory. This book establishes this relationship for several classes of zeta- and *L*-functions over finite fields. DB

Algebra, P. *Elimination Methods in Polynomial Computer Algebra.* Valery Bykov, et al. Math. & Its Applic., V. 448. Kluwer Academic, 1998, xi + 237 pp, \$106. [ISBN 0-7923-5240-8] Methods based on multidimensional residue theory. Illustrates theory with applications to mathematical kinetics.

Algebra, P. *Higher Category Theory.* Eds: Ezra Getzler, Mikhail Kapranov. Contemp. Math., V. 230. AMS, 1998, x + 134 pp, \$34 (P). [ISBN 0-8218-1056-1] Proceedings of a 1997 workshop at Northwestern University.

Algebra, P. *Trends in the Representation Theory of Finite Dimensional Algebras.* Eds: Edward L. Green, Birge Huisgen-Zimmermann. Contemp. Math., V. 229. AMS, 1998, xiii + 356 pp, \$75 (P). [ISBN 0-8218-0928-8] Pro-

ceedings of the 1997 Joint Summer Research Conference at the University of Washington.

Calculus, S(13), L.** *Calculus Mysteries and Thrillers*. R. Grant Woods. MAA, 1998, xix + 131 pp, \$24.95 (P). [ISBN 0-88385-711-1] 11 projects, each in the form of an amusing short story, designed to develop students' modeling and technical writing skills. Appropriate for use in single-variable calculus courses. Includes a sample solution for each project. AO

Calculus, T(13: 1). *Workshop Calculus: Guided Exploration with Review, Volume 2*. Nancy Baxter Hastings, et al. Springer-Verlag, 1998, xxiv + 397 pp, \$39.95 (P). [ISBN 0-387-98349-X] Second of a two-volume series that integrates review of precalculus topics with standard first-semester calculus topics. Designed for use in a "workshop" classroom environment, each volume is a collection of guided exploration activities and homework exercises. (*Volume 1*, TR, October 1997.)

Calculus, T(14: 1). *Vector Calculus*. P.C. Matthews. Springer-Verlag, 1998, ix + 182 pp, \$29.95 (P). [ISBN 3-540-76180-2] Concise introduction. Many references to topics in the physical sciences. Uses suffix notation; includes a chapter on Cartesian tensors. Assumes some knowledge of linear algebra (matrices and determinants), and basic calculus (differentiation, integration, and partial differentiation). Includes solutions to all of the exercises. AO

Calculus, T(13: 3). *Calculus: A New Horizon, Sixth Edition*. Howard Anton. Wiley, 1999, xxxii + 1314 pp, \$94.95. [ISBN 0-471-15306-0] Major revision. More emphasis on conceptual understanding and applicability; some reorganization of topics. (*Fifth Edition*, TR, October 1995.)

Complex Analysis, T(18), S, P. *The Logarithmic Integral I*. Paul Koosis. Stud. in Adv. Math., V. 12. Cambridge Univ Pr, 1998, xviii + 606 pp, \$47.95 (P); \$130. [ISBN 0-521-59672-6; 0-521-30906-9] Corrected paperback edition. (*First Edition*, TR, May 1989.)

Differential Equations, P. *Differential Equations: La Pietra 1996*. Eds: M. Giaquinta, J. Shatah, S.R.S. Varadhan. Proc. of Symp. in Pure Math., V. 65. AMS, 1999, xi + 219 pp, \$39. [ISBN 0-8218-0610-6] Proceedings of a conference held to honor the 70th birthdays of Peter Lax and Louis Nirenberg.

Differential Equations, T(14: 1). *Differential Equations: Graphics, Models, Data*. David Lomen, David Lovelock. Wiley, 1999, xiv + 682 pp, \$96.95. [ISBN 0-471-07648-1] Covers standard set of topics using numeri-

cal, graphical, analytical, and descriptive viewpoints. Encourages an exploratory approach. Motivates many topics using real-world problems or data. AO

Partial Differential Equations, P. *Parametric Lie Group Actions on Global Generalised Solutions of Nonlinear PDEs*. Elemér E. Rosinger. Math. & Its Applic., V. 452. Kluwer Academic, 1998, xvii + 234 pp, \$106. [ISBN 0-7923-5232-7]

Partial Differential Equations, T(15: 1), L. *Beginning Partial Differential Equations*. Peter V. O'Neil. Wiley, 1999, x + 500 pp, \$79.95. [ISBN 0-471-23887-2] For a first course in PDEs. Topics: method of characteristics; classification of second-order equations; well-posedness; Fourier series; wave and heat equations; Dirichlet and Neumann problems. Some exercises require use of a CAS. PG

Numerical Analysis, P. *Parameter Estimation in Nonlinear Dynamical Systems*. W.J.H. Stortelder. CWI Tract, V. 124. Centrum voor Wiskunde en Informatica, 1998, vi + 176 pp, Dfl. 40 (P). [ISBN 90-6196-482-2] Numerical and statistical aspects of the parameter estimation problem for dynamical systems described by differential algebraic equations. Includes several applied case studies.

Numerical Analysis, S(16-17), P, L*. *Matrix Algorithms, Volume I: Basic Decompositions*. G.W. Stewart. SIAM, 1998, xix + 458 pp, \$32 (P). [ISBN 0-89871-414-1] First of a planned 5-volume series for non-specialists. Emphasizes algorithms, their derivation, and their analysis. Initial chapters provide basic background on matrices, linear algebra, and the realities of matrix computations on computers. Subsequent chapters discuss LU, QR, and rank-reducing decompositions. AO

Operator Theory, P. *Operator Algebras and Operator Theory*. Eds: Liming Ge, et al. Contemp. Math., V. 228. AMS, 1998, xx + 389 pp, \$85 (P). [ISBN 0-8218-1093-6] Proceedings of a 1997 conference in Shanghai, China.

Operator Theory, P. *Introduction to Vertex Operator Superalgebras and Their Modules*. Xiaoping Xu. Math. & Its Applic., V. 456. Kluwer Academic, 1998, xvi + 356 pp, \$159. [ISBN 0-7923-5242-4]

Functional Analysis, P. *Geometría de Espacios de Banach*. José A. Facenda Aguirre. Universidad de Sevilla (Porvenir, 27-41013 Sevilla, SPAIN), 1998, vi + 139 pp, (P). [ISBN 84-472-0473-1]

Analysis, S(18), P. *Advanced Integration Theory*. Corneliu Constantinescu, et al. Math. &

Its Applic., V. 454. Kluwer Academic, 1998, x + 861 pp, \$375. [ISBN 0-7923-5234-3] This huge work aims to tie together theories used by probabilists and analysts. Vector lattice theory provides the framework for their study, including L^p -spaces, real measures, absolute continuity. Each section contains many exercises. Good for self-study. KS

Algebraic Geometry, P. *Algebra and Geometry*. Ed: Ming-chang Kang, et al. International Pr, 1998, ix + 227 pp. [ISBN 1-57146-058-6] Proceedings of a 1995 conference at National Taiwan University.

Differential Geometry, P. *The Theory of Finslerian Laplacians and Applications*. Eds: Peter L. Antonelli, Bradley C. Lackey. Math. & Its Applic., V. 459. Kluwer Academic, 1998, xxx + 282 pp, \$146. [ISBN 0-7923-5313-7]

Differential Geometry, P. *Harmonic Maps, Loop Groups, and Integrable Systems*. Martin A. Guest. London Math. Soc. Stud. Texts, V. 38. Cambridge Univ Pr, 1997, xiv + 194 pp, \$21.95 (P); \$59.95. [ISBN 0-521-58932-0; 0-521-58085-4] "The specific goal of this book is to show how the theory of loop groups can be used to study harmonic maps."

Differential Geometry, P. *New Developments in Differential Geometry, Budapest 1996*. Ed: J. Szenthe. Kluwer Academic, 1999, xii + 519 pp, \$227. [ISBN 0-7923-5307-2] 36 papers based on presentations at the conference.

Differential Geometry, P. *Topics in Symplectic 4-Manifolds*. Ed: Ronald J. Stern. Lect. Ser., V. 1. International Pr, 1998, iii + 124 pp. [ISBN 1-57146-019-5] 6 papers based on invited lectures presented at a 1996 conference at the University of California at Irvine.

Geometry, P. *Monge Ampère Equation: Applications to Geometry and Optimization*. Eds: Luis A. Caffarelli, Mario Milman. Contemp. Math., V. 226. AMS, 1999, ix + 172 pp, \$39 (P). [ISBN 0-8218-0917-2] 10 invited lectures and contributed papers from a 1997 NSF-CBMS conference held at Florida Atlantic University.

Topology, P. *Continuous Selections of Multivalued Mappings*. Dušan Repovš, Pavel Vladimirovič Semenov. Math. & Its Applic., V. 455. Kluwer Academic, 1998, viii + 356 pp, \$159. [ISBN 0-7923-5277-7]

Operations Research, P. *Fuzzy Sets in Decision Analysis, Operations Research and Statistics*. Ed: Roman Słowiński. Handbooks of Fuzzy Sets Ser. Kluwer Academic, 1998, xxiv + 453 pp, \$169.95. [ISBN 0-7923-8112-2] 13 chapters in four sections: Decision Mak-

ing; Mathematical Programming; Statistics and Data Analysis; Reliability, Maintenance, and Replacement.

Game Theory, T(18), S, P. *Dynamic Non-cooperative Game Theory, Second Edition*. Tamer Başar, Geert Jan Olsder. Classics in Appl. Math., V. 23. SIAM, 1999, xv + 519 pp, \$49.50 (P). [ISBN 0-89871-429-X] Unabridged, revised republication of the 1995 *Second Edition* originally published by Academic Press. This edition includes new material on the Braess Paradox and on the relationship between the existence of solutions of Riccati equations and the existence of Nash equilibrium solutions. (*First Edition*, TR, April 1984.)

Mathematical Modeling, T(15), L. *Mathematical Analysis for Modeling*. Judah Rosenblatt, Stoughton Bell. Math. Modeling Ser. CRC Pr, 1999, 860 pp, \$69.95. [ISBN 0-8493-8337-4] Presents mathematical framework for modeling problems in science and technology. Topics covered include Riemann and Lebesgue integration, Taylor's theorem, infinite series, multivariable calculus, coordinate systems, matrices, Fourier transforms, and generalized functions. PG

Optimal Control, P. *Differential Geometry and Control*. Eds: G. Ferreyra, et al. Proc. of Symp. in Pure Math., V. 64. AMS, 1999, viii + 341 pp, \$79. [ISBN 0-8218-0887-7] 20 papers from the 1997 AMS Summer Research Institute held at the University of Colorado, Boulder.

Stochastic Processes, P. *Martingales et chaînes de Markov*. Laurent Mazliak, Pierre Priouret, Paolo Baldi. Hermann, 1998, viii + 215 pp, 180 F (P). [ISBN 2-7056-6382-7]

Stochastic Processes, P. *Optimal Filtering, Volume I: Filtering of Stochastic Processes*. Vladimir Fomin. Math. & Its Applic., V. 457. Kluwer Academic, 1999, xiii + 375 pp, \$173. [ISBN 0-7923-5286-6]

Stochastic Processes, P. *Stochastic Partial Differential Equations: Six Perspectives*. Eds: Rene A. Carmona, Boris Rozovskii. Math. Surv. & Mono., V. 64. AMS, 1999, xi + 334 pp, \$49. [ISBN 0-8218-0806-0] 6 survey articles; each presents a different perspective on the primary topic.

Stochastic Processes, P. *One-Dimensional Random Polymers*. R.W. van der Hofstad. CWI Tract, V. 123. Centrum voor Wiskunde en Informatica, 1998, 165 pp, Dfl. 40 (P). [ISBN 90-6196-481-4]

Statistical Methods, P. *Maximum Entropy and Bayesian Methods*. Eds: Gary J. Erickson, Joshua T. Rychert, C. Ray Smith. Fund.

Theories of Physics, V. 98. Kluwer Academic, 1998, ix + 297 pp, \$133. [ISBN 0-7923-5047-2] Proceedings of the 17th International Workshop held at Boise State University in 1997.

Algorithms, T(15–17: 1), S, P, L. *Combinatorial Algorithms: Generation, Enumeration, and Search.* Donald L. Kreher, Douglas R. Stinson. Disc. Math. & Its Applic. CRC Pr, 1999, 329 pp, \$74.95. [ISBN 0-8493-3988-X] Crisp modern treatment. Standard topics plus generation of combinatorial objects, groups and symmetry, computing isomorphisms, basis reduction. Nice concrete examples. RM

Computer Science, T(14–15: 1). *Computer Systems.* J. Stanley Warford. Jones & Bartlett, 1999, xv + 506 pp. [ISBN 0-7637-0794-5]

Computer Science, P. *Reliable Computer Systems: Design and Evaluation, Third Edition.* Daniel P. Siewiorek, Robert S. Swarz. AK Peters, 1998, xix + 908 pp, \$65. [ISBN 1-56881-092-X]

Applications (Biological Science), T(16–17: 2), P, L*. *Mathematical Physiology.* James Keener, James Sneyd. Interdisc. Appl. Math., V. 8. Springer-Verlag, 1998, xix + 766 pp, \$69.95. [ISBN 0-387-98381-3] An introductory survey emphasizing continuous, deterministic approaches. Illustrates how mathematics provides insight into physiological questions as well as how physiological questions can lead to new mathematical problems. First part presents the fundamentals of cellular physiology; second part discusses the physiology of systems. Accessible to mathematicians with little knowledge of physiology. AO

Applications (Engineering), T(14–15: 4). *Advanced Engineering Mathematics, Eighth Edition.* Erwin Kreyszig. Wiley, 1999, xvi + 1273 pp, \$109.95. [ISBN 0-471-15496-2] New edition of this classic text/reference (*Seventh Edition*, TR, January 1995). Major changes: more emphasis on qualitative methods and applications in problem sets; projects of various types (e.g., team, writing, CAS); updated chapters on numerical methods. AO

Applications (Fluid Mechanics), P. *Applications of Group-Theoretical Methods in Hydrodynamics.* V.K. Andreev, et al. Math. & Its Applic., V. 450. Kluwer Academic, 1998, xii + 396 pp, \$205. [ISBN 0-7923-5215-7]

Applications (Fluid Mechanics), P. *Theory of Multicomponent Fluids.* Donald A. Drew, Stephen L. Passman. Appl. Math. Sci., V. 135. Springer-Verlag, 1999, x + 308 pp, \$59.95. [ISBN 0-387-98380-5]

Applications (Physics), T(16–17). *Classical Electrodynamics.* Walter Greiner. Theor. Physics. Springer-Verlag, 1998, x + 555 pp, \$49.95 (P). [ISBN 0-387-94799-X] Careful presentation of classical electrostatics, magnetostatics, and electrodynamics. No exercises, but many worked examples. AO

Applications (Quantum Theory), P. *Quantum Measures and Spaces.* G. Kalmbach. Math. & Its Applic., V. 453. Kluwer Academic, 1998, xi + 343 pp, \$159. [ISBN 0-7923-5288-2]

Applications (Quantum Theory), P. *Dirac Operators and Spectral Geometry.* Giampiero Esposito. Lect. Notes in Phys., V. 12. Cambridge Univ Pr, 1998, xiii + 209 pp, \$34.95 (P). [ISBN 0-521-64862-9]

Applications (Systems Theory), P. *Stability of Finite and Infinite Dimensional Systems.* Michael I. Gil'. Intern. Ser. in Engin. & Comp. Sci. Kluwer Academic, 1998, xviii + 358 pp, \$145. [ISBN 0-7923-8221-8]

Applications (Systems Theory), P. *Lecture Notes in Control and Information Sciences–241: Learning, Control and Hybrid Systems.* Eds: Yutaka Yamamoto, Shinji Hara. Springer-Verlag, 1999, xv + 451 pp, \$92 (P). [ISBN 1-85233-076-7] Proceedings of a 1998 workshop in Bangalore, India, honoring B.A. Francis and M. Vidyasagar.

Applications (Systems Theory), P. *Lecture Notes in Control and Information Sciences–240: Low Gain Feedback.* Zongli Lin. Springer-Verlag, 1999, xvii + 354 pp, \$105 (P). [ISBN 1-85233-081-3]

Applications (Systems Theory), P. *Lecture Notes in Control and Information Sciences–238: Computational Methods for Controller Design.* Nicola Elia, Munther A. Dahleh. Springer-Verlag, 1998, xi + 153 pp, \$59 (P). [ISBN 1-85233-075-9]

Applications (Systems Theory), P. *Lecture Notes in Control and Information Sciences–239: Finite Spectrum Assignment for Time-Delay Systems.* Qing-Gou Wang, Tong Heng Lee, Kok Kiong Tan. Springer-Verlag, 1999, viii + 117 pp, \$45 (P). [ISBN 1-85233-065-1]

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