

Telegraphic Reviews



The American Mathematical Monthly, Vol. 106, No. 2. (Feb., 1999), pp. 185-188.

Stable URL:

<http://links.jstor.org/sici?sici=0002-9890%28199902%29106%3A2%3C185%3ATR%3E2.0.CO%3B2-A>

The American Mathematical Monthly is currently published by Mathematical Association of America.

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/maa.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

The JSTOR Archive is a trusted digital repository providing for long-term preservation and access to leading academic journals and scholarly literature from around the world. The Archive is supported by libraries, scholarly societies, publishers, and foundations. It is an initiative of JSTOR, a not-for-profit organization with a mission to help the scholarly community take advantage of advances in technology. For more information regarding JSTOR, please contact support@jstor.org.

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.*

General, P, L***. *Handbook of Writing for the Mathematical Sciences, Second Edition*. Nicholas J. Higham. SIAM, 1998, xvi + 302 pp, \$34 (P). [ISBN 0-89871-420-6] Extensively revised and updated; several new chapters and some new sections. Well-organized, excellent advice enlivened with humor. Every mathematician should have a copy within easy reach. (*First Edition*, TR, April 1994.) AO

General, P*, L*. *The World According to Wavelets: The Story of a Mathematical Technique in the Making, Second Edition*. Barbara Burke Hubbard. AK Peters, 1998, xx + 330 pp, \$40. [ISBN 1-56881-072-5] New material on the history and applications of wavelets; updated bibliography and list of web sites. Well-written. Accessible to undergraduates. (*First Edition*, TR, January 1997.) AO

Reference, S(14-16), P, L. *Mathematical Methods for Physics and Engineering*. K.F. Riley, M.P. Hobson, S.J. Bence. Cambridge Univ Pr, 1997, xix + 1008 pp, \$49.95 (P); \$110. [ISBN 0-521-55529-9; 0-521-55506-X] Brief expositions of a wide variety of mathematical tools including basic calculus, ODEs, PDEs, complex analysis, tensors, calculus of variations, integral equations, group theory, probability, numerical methods, and more. Each topic is introduced qualitatively, then more rigorously. Includes numerous worked examples, exercises, hints, and answers. AO

Precalculus, T(13: 2), S*. *Precalculus in Context: Projects for the Real World, Second Edition*. Marsha J. Davis, Judith Flagg Moran, Mary E. Murphy. Brooks/Cole, 1998, xvii +

311 pp, \$25.95 (P). [ISBN 0-534-35232-4] Thirteen labs designed for group collaboration and exploration of typical precalculus topics; each lab is followed by more guided explorations and projects. Uses graphing technology extensively. MW

Education, P, L***. *Writing in the Teaching and Learning of Mathematics*. John Meier, Thomas Rishel. MAA Notes No. 48. MAA, 1998, xiii + 100 pp, \$18.95 (P). [ISBN 0-88385-158-X] Reflections on why to use writing assignments as well as advice on creating effective assignments. Most sections include exercises/discussion questions. Easy to read; numerous examples illustrate approaches and pitfalls. An important and valuable resource. AO

Education, P. *Teacher-Made Aids for Elementary School Mathematics, Volume 3*. Ed: Carole J. Reesink. NCTM, 1998, vi + 377 pp, \$17.95 (P). [ISBN 0-87353-463-8] A collection of articles published in the *Arithmetic Teacher* and *Teaching Children Mathematics* between 1984 and 1997.

Education, P*, L**. *History of Mathematics: Histories of Problems*. The Inter-IREM Commission. Transl: Chris Weeks. Ellipses (Edition Marketing S.A., 32 rue Bague, 75740 Paris, Cedex 15), 1997, 429 pp, 220F. [ISBN 2-7298-4730-8] A "great problems" approach to the history and culture of mathematics aimed at teachers. Each chapter explores the historical evolution of a single problem and the tools developed for its solution. Includes historical material, bibliographies, exercises. AO

Education, S, L. *Twenty Years Before the*

Blackboard: The Lessons and Humor of a Mathematics Teacher. Michael Stueben with Diane Sandford. Spectrum Ser. MAA, 1998, xi + 155 pp, \$29.50 (P). [ISBN 0-88385-525-9] A potpourri of stories, maxims, fables, trifles, paradoxes, proofs, and jests drawn from the author's two decades of experience as a high school mathematics teacher. A mildly useful source of enrichment for teachers of today. LAS

Education, P. *Perspectives on the Teaching of Geometry for the 21st Century: An ICMI Study.* Eds: Carmelo Mammanna, Vinicio Villani. ICMI Study Ser., V. 5. Kluwer Academic, 1998, viii + 353 pp, \$129. [ISBN 0-7923-4990-3] Outgrowth of ICME-7 (1992) and subsequent Catania Conference (1995). Highlights major trends and improvements in geometry teaching. Traces evolution of geometry curricula in several countries. Addresses issues in assessment and teacher education. MW

Education, P, L. *Language and Communication in the Mathematics Classroom.* Eds: Heinz Steinbring, Maria G. Bartolini Bussi, Anna Sierpiska. NCTM, 1998, vii + 351 pp, \$11.95 (P). [ISBN 0-87353-441-7] Twenty papers from teachers and researchers around the world derived from presentations at ICME-7 (1992) in Quebec. Stresses the cultural roots of communication and their implications for discussion in mathematics classes. "The meanings of mathematical terms . . . are not merely linguistic: they are cultural." LAS

History, P. *Collected Papers of Norman Alling.* Ed: Paulo Ribenboim. Papers in Pure & Appl. Math., V. 107. Queen's Univ, 1998, xii + 597 pp, (P). [ISBN 088941-796-9]

History, P, L*. *Trigonometric Delights.* Eli Maor. Princeton Univ Pr, 1998, xiv + 236 pp, \$24.95. [ISBN 0-691-05754-0] An enjoyable blend of mathematics, history, and biography. Most of the book is accessible to readers with only a basic background in high school algebra and trigonometry; the remainder assumes some knowledge of first-year calculus. AO

Linear Algebra, T*(13-14: 1). *The Keys to Linear Algebra: Applications, Theory, and Reasoning.* Daniel Solow. BookMasters (PO Box 388, 1444 St. Route 42, Ashland, OH 44805), 1998, ix + 548 pp, \$49.95. [ISBN 0-9644519-2-1] Aims to teach the thinking process. Each chapter is organized around a motivating application. Exercises on mechanics, theory, and technology-based problem solving. TH

Algebra, T(18: 2), P, L. *Representations and Invariants of the Classical Groups.* Roe Goodman, Nolan R. Wallach. Ency. of Math. & Its

Applic., V. 68. Cambridge Univ Pr, 1998, xvi + 685 pp, \$100. [ISBN 0-521-58273-3] Updates and continues the theory found in Weyl's *The Classical Groups* (TR, April 1998). Abundant examples and exercises. TH

Algebra, P. *The Book of Involutions.* Max-Albert Knus, et al. Colloq. Pub., V. 44. AMS, 1998, xxi + 593 pp, \$69. [ISBN 0-8218-0904-0] Theory of central simple algebras with involution in relation with linear algebraic groups.

Algebra, P. *Abelian Groups, Module Theory, and Topology: Proceedings in Honour of Adalberto Orsatti's 60th Birthday.* Eds: Dikran Dikranjan, Luigi Salce. Lect. Notes in Pure & Appl. Math., V. 201. Marcel Dekker, 1998, xv + 444 pp, \$165 (P). [ISBN 0-8247-1937-9] Papers from a 1997 conference in Padua, Italy.

Algebra, T(15-17: 1), L*. *Discrete Mathematics Using Latin Squares.* Charles F. Laywine, Gary L. Mullen. Ser. in Disc. Math. & Optimiz. Wiley, 1998, xv + 305 pp, \$79.95. [ISBN 0-471-24064-8] Theory of mutually orthogonal Latin squares with applications to combinatorics, statistics, error-correcting codes, and cryptology. Assumes some familiarity with finite fields. DB

Calculus, T(13: 2), L. *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists.* Frederick R. Adler. Brooks/Cole, 1998, xvi + 784 pp, \$73.95. [ISBN 0-534-34816-5] Written to introduce life science majors to concepts fundamental to theoretical biology. Uses themes of growth, diffusion, and selection to present three types of models: discrete-time dynamical systems, differential equations, stochastic processes. Covers many traditional calculus topics as well as some from probability and statistics. AO

Calculus, S*(14), L*. *Div, Grad, Curl, and All That: An Informal Text on Vector Calculus, Third Edition.* H.M. Schey. WW Norton, 1997, ix + 164 pp, \$20 (P). [ISBN 0-393-96997-5] Minor textual changes, corrections, and several new exercises. Major change is replacement of the operators div, grad, and curl by $\nabla \cdot$, ∇ , and $\nabla \times$, respectively. (First Edition, TR, November 1973.) AO

Differential Equations, S(14). *Solving Differential Equations with MAPLE V Release 4.* David Barrow, et al. Brooks/Cole, 1998, viii + 253 pp, \$21.50 (P). [ISBN 0-534-34555-7] A guide to using Maple's symbolic, graphical, and numerical capabilities. Introduces basic commands for dealing with differential equations, illustrates their use in applied contexts. Final chapter contains several projects. AO

- Differential Equations, T(16–17).** *Computer Methods for Ordinary Differential Equations and Differential-Algebraic Equations.* Uri M. Ascher, Linda R. Petzold. SIAM, 1998, xvii + 314 pp, \$36.50 (P). [ISBN 0-89871-412-5] Text for a first course on the numerical solution of ODEs. Covers both initial-value and boundary-value problems as well as differential-algebraic equations. A practical introduction to basic methods and issues. AO
- Differential Equations, T(14: 1).** *Introduction to Ordinary Differential Equations.* Stephen H. Saperstone. Brooks/Cole, 1998, xiv + 634 pp, \$69.95. [ISBN 0-314-05819-2] Uses visualization tools, numerical estimation, and symbolic computation (including a computer algebra system). Covers all the traditional topics with somewhat more than the usual emphasis on modeling. AO
- Differential Equations, T**(14: 1).** *Differential Equations.* Paul Blanchard, Robert L. Devaney, Glen R. Hall. Brooks/Cole, 1998, xv + 732 pp, \$62.95. [ISBN 0-534-34550-6] A substantial departure from traditional approaches to the subject; based on a dynamical systems point of view. Uses qualitative, numerical, and analytic approaches throughout. Worth a thoughtful look! AO
- Differential Equations, T*(14: 1).** *Differential Equations: A Modeling Perspective.* Robert L. Borrelli, Courtney S. Coleman. Wiley, 1998, xiii + 706 pp, \$86.95. [ISBN 0-471-04230-7] Covers basic theory and closed form solution techniques as well as topics motivated by the modern view of differential systems as evolving dynamical systems (e.g., long-term behavior, sensitivity, bifurcation). Modeling and graphical visualization are central themes. Assumes access to a numerical solver. AO
- Dynamical Systems, S(18).** *Dynamical Systems and Ergodic Theory.* Mark Pollicott, Michiko Yuri. London Math. Soc. Stud. Texts, V. 40. Cambridge Univ Pr, 1998, xiii + 179 pp, \$22.95 (P); \$59.95. [ISBN 0-521-57599-0; 0-521-57294-0] An introduction to topological dynamics and ergodic theory. Useful as a reference for those who already have a firm understanding of the basic topics and their overall organization. Very few applications. DK
- Dynamical Systems, T(16–17: 2), P.** *Elements of Applied Bifurcation Theory, Second Edition.* Yuri A. Kuznetsov. Appl. Math. Sci., V. 112. Springer-Verlag, 1998, xix + 591 pp, \$69.95. [ISBN 0-387-98382-1] An introduction to nonlinear dynamical systems. This edition contains new and improved numerical methods for bifurcation analysis, more complete analysis of codim 1 bifurcations (*First Edition*, TR, March 1996). SN
- Numerical Analysis, S*(17), P, L*.** *Afternotes Goes to Graduate School: Lectures on Advanced Numerical Analysis.* G.W. Stewart. SIAM, 1998, xii + 245 pp, \$35 (P). [ISBN 0-87871-404-4] Topics: discrete and continuous approximation, linear and quadratic splines, eigensystems, and Krylov sequence methods. Also notes from two lectures on classical iterative methods and nonlinear equations. AO
- Differential Geometry, P.** *Geometry of Differential Equations.* Eds: A. Khovanskiĭ, A. Varchenko, V. Vassiliev. AMS Transl. Ser. 2, V. 186. AMS, 1998, xi + 194 pp, \$89. [ISBN 0-8218-1094-4] 7 articles written by colleagues of V.I. Arnold in honor of his 60th birthday.
- Geometry, T(15–16: 2).** *Modern Geometries, Fifth Edition.* James R. Smart. Brooks/Cole, 1998, xvii + 451 pp, \$68.95. [ISBN 0-534-35188-3] Fine tuning includes increase in number of exercises, expanded sections on fractals, updates to bibliography, references to dynamic geometry software (*Fourth Edition*, TR, August–September 1994). MW
- Geometry, T(1), S*(15–16).** *Active Geometry.* David A. Thomas. Brooks/Cole, 1998, 139 pp, \$20.75 (P). [ISBN 0-543-34485-2] Hands-on investigations in both Euclidean and non-Euclidean geometries using computer modeling and analysis tools. Especially useful in courses for teachers. MW
- Geometry, T(14), L.** *The Geometry Toolbox for Graphics and Modeling.* Gerald E. Farin, Dianne Hansford. AK Peters, 1998, xv + 288 pp, \$48. [ISBN 1-56881-074-1] Highly visual approach to basic two- and three-dimensional geometry and linear algebra. Approaches linear algebra from a geometric viewpoint, and geometry from an algorithmic viewpoint. Useful background for courses in computer graphics and geometric modeling. AO
- Topology, S(16–18), L.** *The Four-Color Theorem: History, Topological Foundations, and Idea of Proof.* Rudolf Fritsch, Gerda Fritsch. Transl: Julie Peschke. Springer-Verlag, 1998, xvi + 260 pp, \$29.95. [ISBN 0-387-98497-6] A thorough retrospective on the four-color drama including biographies of key actors (Guthrie, deMorgan, Hamilton, ... Heesch, Haken, Appel), careful topological foundations (e.g., on arcwise accessibility) to rule out fractal “monsters,” and a thorough exposition of the proof (reducibility, obstructions, discharging procedures). LAS
- Optimization, T(17: 1), P, L.** *Interior Point*

Algorithms: Theory and Analysis. Yinyu Ye. Ser. in Disc. Math. & Optim. Wiley, 1997, xvi + 418 pp, \$74.95. [ISBN 0-471-17420-3] Exposition of the theory, analysis, and implementation of interior point methods. Emphasizes geometry and potential theory for convex inequalities. AO

Optimization, P. *New Trends in Mathematical Programming: Homage to Steven Vajda.* Eds: Franco Giannessi, Sándor Komlósi, Tamás Rapcsák. Appl. Optim., V. 13. Kluwer Academic, 1998, xi + 314 pp, \$140. [ISBN 0-7923-5036-7] 22 papers on recent advances.

Optimization, T(18), P*, L. *Theory and Algorithms for Linear Optimization: An Interior Point Approach.* C. Roos, T. Terlaky, J.-Ph. Vial. Ser. in Disc. Math. & Optim. Wiley, 1997, xxiv + 482 pp, \$100. [ISBN 0-471-95676-7] An interior point approach to both theoretical and algorithmic aspects of linear optimization. First part presents duality theory and a polynomial method for solving linear optimization problems. Remainder discusses logarithmic barrier methods, target-following approaches, and various other topics of theoretical and practical interest. AO

Optimization, P. *Minimax Theory and Applications.* Eds: Biagio Ricceri, Stephen Simons. Nonconvex Optim. & Its Applic., V. 26. Kluwer Academic, 1998, xi + 271 pp, \$119. [ISBN 0-7923-5064-2] Proceedings of a 1996 workshop held in Erice, Italy.

Game Theory, S*(16-18). *Evolutionary Games and Population Dynamics.* Josef Hofbauer, Karl Sigmund. Cambridge Univ Pr, 1998, xxvii + 323 pp, \$27.95 (P); \$69.95. [ISBN 0-521-62570-X; 0-521-62365-0] A fascinating combination of dynamical systems and game theory in the service of understanding evolution and population dynamics. Suitable for either a mathematician interested in learning about biology or a mathematically knowledgeable biologist interested in learning about theoretical approaches. DK

Mathematical Modeling, T(13-14): 1), L. *A First Course in Mathematical Modeling, Second Edition.* Frank R. Giordano, Maurice D. Weir, William P. Fox. Brooks/Cole, 1997, xviii + 525 pp, \$62.50. [ISBN 0-534-22248-X] This edition adds chapters on discrete dynamical systems, linear programming and numerical search methods, and an introduction to probabilistic modeling. Emphasizes model construction process. (*First Edition*, TR, August-September 1985.) AO

Mathematical Computing, P. *Essential MAT-*

LAB for Scientists and Engineers. Brian D. Hahn. Wiley, 1997, x + 265 pp, \$39.95 (P). [ISBN 0-470-25013-5] Offers a "teach-yourself" approach to using *MATLAB*. Does not assume prior knowledge of matrices or programming techniques.

Computer Science, P. *Logic Programming.* Ed: Joxan Jaffar. MIT Pr, 1998, xvii + 361 pp, \$85 (P). [ISBN 0-262-60031-5] Proceedings of the 1998 Joint International Conference and Symposium on Logic Programming held at the University of Manchester, U.K.

Applications (Physics), T(17): 2). *Classical Dynamics: A Contemporary Approach.* Jorge V. José, Eugene J. Saletan. Cambridge Univ Pr, 1998, xxv + 670 pp, \$54.95 (P); \$125. [ISBN 0-521-63636-1; 0-521-63176-9] Comprehensive treatment of dynamics from a modern perspective. Solid treatments of Lagrangian and Hamiltonian dynamics, scattering and linear oscillators, canonical transforms, Liouville and Darboux theorems, non-linear dynamics (chaos, KAM theorem), continuum dynamics (chaos, solitons, Navier-Stokes), etc. Many interesting worked-out examples. RM

Applications (Quantum Theory), P. *Secondary Calculus and Cohomological Physics.* Eds: Marc Henneaux, Joseph Krasil'shchik, Alexandre Vinogradov. Contemp. Math., V. 219. AMS, 1998, xiv + 287 pp, \$60 (P). [ISBN 0-8218-0828-1] Proceedings of a 1997 conference held at Moscow State University (Russia).

Applications (Quantum Theory), P. *Coherent Transform, Quantization, and Poisson Geometry.* Ed: M.V. Karasev. AMS Transl. Ser. 2, V. 187. AMS, 1998, x + 360 pp, \$119. [ISBN 0-8218-1178-9] Three articles on problems in quantization theory, as well as in symplectic and Poisson geometry.

Applications, P. *Lecture Notes in Control and Information Sciences-236: Autonomous Robotic Systems.* Eds: Anibal T. de Almeida, Oussama Khatib. Springer-Verlag, 1998, viii + 275 pp, \$79 (P). [ISBN 1-85233-036-8] Tutorial papers from a 1997 workshop at the University of Coimbra (Portugal). In four sections: Sensors and Navigation; Cooperation and Telerobotics; Applications; Legged and Climbing Robots.

Reviewers

DB: David Bressoud, Macalester; TH: Tom Halverson, Macalester; DK: Danny Kaplan, Macalester; RM: Richard Molnar, Macalester; SN: Sam Northshield, Carleton; AO: Arnold Ostebee, St. Olaf; LAS: Lynn Arthur Steen, St. Olaf; MW: Martha Wallace, St. Olaf.