

Editorial Information

As of October 3, 1994, the backlog for this journal was approximately 0 issues. This estimate is the result of dividing the number of manuscripts for this journal in the Providence office that have not yet gone to the printer on the above date by the average number of articles per issue over the previous twelve months, reduced by the number of issues published in six months (the time necessary for editing and composing a typical issue).

A Copyright Transfer Agreement is required before a paper will be published in this journal. By submitting a paper to this journal, authors certify that the manuscript has not been submitted to nor is it under consideration for publication by another journal, conference proceedings, or similar publication.

Information for Authors and Editors

The first page must consist of a *descriptive title*, followed by an *abstract* that summarizes the article in language suitable for workers in the general field (algebra, analysis, etc.). The *descriptive title* should be short, but informative; useless or vague phrases such as “some remarks about” or “concerning” should be avoided. The *abstract* must be brief and reasonably self-contained. Included with the footnotes to the paper, there should be the 1991 *Mathematics Subject Classification* representing the primary and secondary subjects of the article. This may be followed by a list of *key words and phrases* describing the subject matter of the article and taken from it. A list of the numbers may be found in the annual index of *Mathematical Reviews*, published with the December issue starting in 1990, as well as from the electronic service e-MATH [telnet e-MATH.ams.com (or telnet 130.44.1.100)]. Login and password are e-math]. For journal abbreviations used in bibliographies, see the list of serials in the latest *Mathematical Reviews* annual index. When the manuscript is submitted, authors should supply the editor with electronic addresses if available. These will be printed after the postal address at the end of each article.

Electronically prepared manuscripts. The AMS encourages submission of electronically prepared manuscripts in $\mathcal{A}\mathcal{M}\mathcal{S}\text{-T}\mathcal{E}\mathcal{X}$ or $\mathcal{A}\mathcal{M}\mathcal{S}\text{-L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ because properly prepared electronic manuscripts save the author proofreading time and move more quickly through the production process. To this end, the Society has prepared “preprint” style files, specifically the amsppt style of $\mathcal{A}\mathcal{M}\mathcal{S}\text{-T}\mathcal{E}\mathcal{X}$ and the amsart style of $\mathcal{A}\mathcal{M}\mathcal{S}\text{-L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$, which will simplify the work of authors and of the production staff. Those authors who make use of these style files from the beginning of the writing process will further reduce their own effort. Electronically submitted manuscripts prepared in plain $\text{T}\mathcal{E}\mathcal{X}$ or $\text{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ do not mesh properly with the AMS production systems and cannot, therefore, realize the same kind of expedited processing. Users of plain $\text{T}\mathcal{E}\mathcal{X}$ should have little difficulty learning $\mathcal{A}\mathcal{M}\mathcal{S}\text{-T}\mathcal{E}\mathcal{X}$, and $\text{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ users will find that $\mathcal{A}\mathcal{M}\mathcal{S}\text{-L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ is the same as $\text{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ with additional commands to simplify the typesetting of mathematics.

Guidelines for Preparing Electronic Manuscripts provides additional assistance and is available for use with either $\mathcal{A}\mathcal{M}\mathcal{S}\text{-T}\mathcal{E}\mathcal{X}$ or $\mathcal{A}\mathcal{M}\mathcal{S}\text{-L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$. Authors with FTP access may obtain *Guidelines* from the Society’s Internet node e-MATH.ams.org (130.44.1.100). For those without FTP access *Guidelines* can be obtained free of charge from the e-mail address guide-elec@math.ams.org (Internet) or from the Customer Services Department, American

Mathematical Society, P.O. Box 6248, Providence, RI 02940-6248. When requesting *Guidelines*, please specify which version you want.

At the time of submission, authors should indicate if the paper has been prepared using \LaTeX or \LaTeX . The *Manual for Authors of Mathematical Papers* should be consulted for symbols and style conventions. The *Manual* may be obtained free of charge from the e-mail address `cust-serv@math.ams.org` or from the Customer Services Department, American Mathematical Society, P.O. Box 6248, Providence, RI 02940-6248. The Providence office should be supplied with a manuscript that corresponds to the electronic file being submitted.

Electronic manuscripts should be sent to the Providence office immediately after the paper has been accepted for publication. They can be sent via e-mail to `pub-submit@math.ams.org` (Internet) or on diskettes to the Publications Department, American Mathematical Society, P.O. Box 6248, Providence, RI 02940-6248. When submitting electronic manuscripts please be sure to include a message indicating in which publication the paper has been accepted. No corrections will be accepted electronically. Authors must mark their changes on their proof copies and return them to the Providence office. Authors and editors are encouraged to make the necessary submissions of electronically prepared manuscripts and proof copies in a timely fashion.

An author should submit the original and two copies of the manuscript and retain one copy. The author may suggest an appropriate editor for his paper. All contributions intended for publication and all books for review should be addressed to Walter Gautschi, Chairman, Editorial Committee, Mathematics of Computation, Department of Computer Sciences, Purdue University, West Lafayette, Indiana 47907. The date received, which is published with the final version of an accepted paper, is the date received in the office of the Chairman of the Editorial Committee, and it is the responsibility of the author to submit manuscripts directly to this office.

Any inquiries concerning a paper that has been accepted for publication should be sent directly to the Editorial Department, American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248.

Editorial Committee

WALTER GAUTSCHI, Chairman. Department of Computer Sciences, Purdue University, West Lafayette, IN 47907; *E-mail*: `wxg@cs.purdue.edu`

ANDREW M. ODLYZKO, AT&T Bell Laboratories, 600 Mountain Avenue, Murray Hill, NJ 07974; *E-mail*: `amo@research.att.com`

FRANK W. J. OLVER, Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742; *E-mail*: `olver@bessel.umd.edu`

LARS B. WAHLBIN, Department of Mathematics, Cornell University, Ithaca, NY 14853; *E-mail*: `wahlbin@math.cornell.edu`

Technical Editor

ERIKA GAUTSCHI, Department of Computer Sciences, Purdue University, West Lafayette, IN 47907; *E-mail*: `exg@cs.purdue.edu`

Board of Associate Editors

JAMES H. BRAMBLE, Department of Mathematics, Cornell University, Ithaca, NY 14853; *E-mail*: `bramble@math.cornell.edu`

SUSANNE C. BRENNER, Department of Mathematics, University of South Carolina, Columbia, SC 29208; *E-mail*: brenner@math.scarolina.edu

E. W. CHENEY, Department of Mathematics, University of Texas at Austin, Austin, TX 78712-1082; *E-mail*: cheney@cs.utexas.edu

EUGENE ISAACSON, Courant Institute of Mathematical Sciences, New York University, 251 Mercer Street, New York, NY 10012; *E-mail*: isaacson@acf7.nyu.edu

JAMES N. LYNESS, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439; *E-mail*: lyness@mcs.anl.gov

HARALD NIEDERREITER, Institute for Information Processing, Austrian Academy of Sciences, Sonnenfelsgasse 19, A-1010 Vienna, Austria; *E-mail*: nied@qiinfo.oeaw.ac.at

JORGE J. NOCEDAL, Department of Electrical Engineering and Computer Science, Northwestern University, Evanston, IL 60208-3118; *E-mail*: nocedal@eecs.nwu.edu

SYVERT P. NØRSETT, Division of Numerical Mathematics, The University of Trondheim and The Norwegian Institute of Technology, Alfred Getz vei 1, N-7034 Trondheim-NTH, Norway; *E-mail*: norsett@imf.unit.no

JOHN E. OSBORN, Department of Mathematics, University of Maryland, College Park, MD 20742; *E-mail*: jeo@julia.umd.edu

STANLEY OSHER, Department of Mathematics, University of California, Los Angeles, CA 90024; *E-mail*: sjo@math.ucla.edu

CARL POMERANCE, Department of Mathematics, The University of Georgia, Athens, GA 30602; *E-mail*: carl@math.uga.edu

RENÉ SCHOOF, Dipartimento di Matematica, 2^a Università di Roma "Tor Vergata", I-00133 Roma, Italy; *E-mail*: schoof@volterra.science.unitn.it; and schoof@fwl.uva.nl

L. RIDGWAY SCOTT, Department of Mathematics, University of Houston, Houston, TX 77204-3476; *E-mail*: scott@casc.math.uh.edu

DANIEL SHANKS, Department of Mathematics, University of Maryland, College Park, MD 20742; *E-mail*: dns@gaby.umd.edu

CHI-WANG SHU, Applied Mathematics Division, Brown University, Providence, RI 02912-0001; *E-mail*: shu@cfm.brown.edu

FRANK STENGER, Department of Computer Science, University of Utah, Salt Lake City, UT 84112; *E-mail*: stenger@cs.utah.edu

HANS J. STETTER, Institut für Numerische Mathematik, Technische Universität Wien, Wiedner Hauptstrasse 6-10, A-1040, Wien, Austria; *E-mail*: stetter@uranus.tuwien.ac.at

G. W. STEWART, Department of Computer Science, University of Maryland, College Park, MD 20742; *E-mail*: stewart@thales.cs.umd.edu

NICO M. TEMME, Stichting Mathematisch Centrum, Centrum voor Wiskunde en Informatica, Kruislaan 413, 1098 SJ Amsterdam, The Netherlands; *E-mail*: nicot@cwi.nl

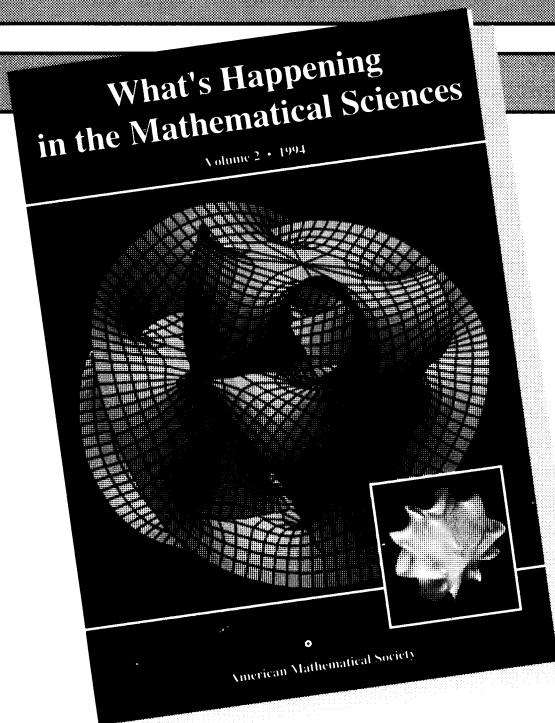
VIDAR THOMÉE, Mathematics Department, Chalmers University of Technology, S-412 96 Göteborg, Sweden; *E-mail*: thomee@math.chalmers.se

HUGH C. WILLIAMS, Department of Computer Science, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2; *E-mail*: Hugh.Williams@csmail.cs.umanitoba.ca

JOHN W. WRENCH, JR., 102 Mt. Olivet Boulevard, Frederick, MD 21701

What's Happening in the Mathematical Sciences

**Volume
Two!**



Barry Cipra

What our readers are saying about Volume 1

*"The writing is brilliant,
positively brilliant."*

"A terrific publication."

*"This is a wonderful tool for showing
people what mathematics is about and
what mathematicians can do."*

*"A must for all mathematics department
reading and coffee lounges."*

Volume 2 of *What's Happening* features the same lively writing as Volume 1, and has all new topics. Here you can read about a new class of solitons, the contributions wavelets are making to solving scientific problems, how mathematics is improving medical imaging, and Andrew Wiles's acclaimed work on Fermat's Last Theorem. *What's Happening* can be recommended to all mathematics majors, graduate students, and mathematics clubs—not to mention mathematicians who enjoy reading about recent developments in fields other than their own. *What's Happening* highlights the excitement and wonder of mathematics.

1991 MSC: 00; ISBN 0-8218-8998-2, 51 pp. (softcover), July 1994

List \$8; **Order code HAPPENING/MC**

Volume 1, 1993, List \$7, **Order code HAPPENING/1MC**

Order Volume 3, 1995 now and pay the Volume 2 price of \$8!

Offer expires 1/1/95. Est. publ. date December 1995, **Order code HAPPENING/3MC**

**Order Volumes 1-3
TODAY!**

Standing orders and bulk order discounts are available!
To order call toll free 800-321-4AMS

All prices subject to change. Free shipment by surface: for air delivery, please add \$6.50 per title. *Prepayment required.*
Order from: American Mathematical Society, P.O. Box 5904, Boston, MA 02206-5904, or call toll free 800-321-4267
in the U.S. and Canada to charge with VISA or MasterCard. Residents of Canada, please include 7% GST.



(Continued from back cover)

F. Arnault , Rabin-Miller primality test: Composite numbers which pass it	355
Karl Dilcher and Ladislav Skula , A new criterion for the first case of Fermat's last theorem	363
Gary B. Gostin , New factors of Fermat numbers	393
Harvey Dubner and Wilfrid Keller , Factors of generalized Fermat numbers	397
Jon Grantham , The largest prime dividing the maximal order of an element of S_n	407
David Applegate and Jeffrey C. Lagarias , Density bounds for the $3x + 1$ problem. I. Tree-search method	411
David Applegate and Jeffrey C. Lagarias , Density bounds for the $3x + 1$ problem. II. Krasikov inequalities	427
Reviews and Descriptions of Tables and Books	439
Gradshteyn and Ryzhik 1 , Egorov, Sobolevsky, and Yanovich 2 , Petryshyn 3 , Beale, Cottet, and Huberson, Editors 4 , Arbel 5 , Moré and Wright 6 , Kronsjö and Shumsheruddin, Editors 7	
Table Errata	449
Gradshteyn and Ryzhik 617	
Supplement to "The Faber polynomials for annular sectors" by John P. Coleman and Nick J. Myers	S1
Microfiche Supplement	
F. Diaz y Diaz and M. Olivier , Imprimitve ninth-degree number fields with small discriminants	

MATHEMATICS OF COMPUTATION
CONTENTS

Vol. 64, No. 209

January 1995

Ricardo H. Nochetto , Pointwise a posteriori error estimates for elliptic problems on highly graded meshes	1
Shangyou Zhang , Optimal-order nonnested multigrid methods for solving finite element equations III: On degenerate meshes	23
Weimin Han and Søren Jensen , On the sharpness of L^2 -error estimates of H_0^1 -projections onto subspaces of piecewise, high-order polynomials	51
Lixin Wu , The semigroup stability of the difference approximations for initial-boundary value problems	71
L. Bales and I. Lasiecka , Negative norm estimates for fully discrete finite element approximations to the wave equation with nonhomogeneous L_2 Dirichlet boundary data	89
R. A. Nicolaides and Noel J. Walkington , Strong convergence of numerical solutions to degenerate variational problems	117
Tony F. Chan and Panayot S. Vassilevski , A framework for block ILU factorizations using block-size reduction	129
I. C. Demetriou , Discrete piecewise monotonic approximation by a strictly convex distance function	157
John P. Coleman and Nick J. Myers , The Faber polynomials for annular sectors	181
Djurdje Cvijović and Jacek Klinowski , Closed-form summation of some trigonometric series	205
Frank Stenger , Collocating convolutions	211
G. Mastroianni and G. Monegato , Convergence of product integration rules over $(0, \infty)$ for functions with weak singularities at the origin	237
Arno Kuijlaars , Chebyshev-type quadrature and partial sums of the exponential series	251
Abraham Ziv , Converting approximate error bounds into exact ones	265
Harald Niederreiter , Pseudorandom vector generation by the multiple-recursive matrix method	279
Georges Rhin and Christopher Smyth , On the absolute Mahler measure of polynomials having all zeros in a sector	295
F. Diaz y Diaz and M. Olivier , Imprimitive ninth-degree number fields with small discriminants	305
Stéphane Louboutin , Determination of all nonquadratic imaginary cyclic number fields of 2-power degrees with ideal class groups of exponents ≤ 2	323
Irving Kaplansky , The first nontrivial genus of positive definite ternary forms	341
Harald Niederreiter and Rainer Göttfert , On a new factorization algorithm for polynomials over finite fields	347

(Continued on inside back cover)



0025-5718(199501)64:209;1-N