VOLUME 27 NUMBER 2 OCTOBER 1992

BULLETIN (NEW SERIES) OF THE AMERICAN MATHEMATICAL SOCIETY

EDITORS

Richard S. Palais, *Research-Expository Papers*
Murray Protter, *Book Reviews*
Frank Quinn, *Research Announcements*

PROVIDENCE, RHODE ISLAND USA

ISSN 0273-0979

Bulletin (New Series) of the American Mathematical Society

This journal is devoted to articles of the following types:

Research-Expository Papers

These are, by definition, papers that present a clear and insightful exposition of significant aspects of contemporary mathematical research. Gibbs lectures, Progress in Mathematics lectures, and retiring presidential addresses will be included in this section.

Research Announcements

The purpose of this department is to publish quickly and disseminate widely significant new mathematics. A Research Announcement should be designed to communicate its contents to a broad mathematical audience and should meet high standards for clarity as well as mathematical content.

Book Reviews

Book Reviews are accepted for publication by invitation only. Unsolicited manuscripts will not be considered.

Subscription information. *Bulletin (New Series) of the American Mathematical Society* is published quarterly. Subscription prices for Volumes 26 and 27 (1992) are $202 list, $162 institutional member, $121 individual member. The subscription price for members is included in the annual dues. A late charge of 10% of the subscription price will be imposed upon orders received from nonmembers after January 1 of the subscription year. Subscribers outside the United States and India must pay a postage surcharge of $8.00; subscribers in India must pay a postage surcharge of $13.00. Expedited delivery to destinations in North America $12; elsewhere $21. Beginning in January 1992, the Bulletin will be available from the electronic service e-MATH [**telnet e-MATH.ams.com** (or **telnet 130.44.1.100**). Login and password are **e-math**.]

Back number information. For back issues see the *AMS Catalog of Publications.*

Subscriptions and orders should be addressed to the American Mathematical Society, P. O. Box 1571, Annex Station, Providence, RI 02901-1571. *All orders must be accompanied by payment.* Other correspondence should be addressed to P. O. Box 6248, Providence, RI 02940-6248.

Copying and reprinting. Individual readers of this publication, and nonprofit libraries acting for them, are permitted to make fair use of the material, such as to copy an article for use in teaching or research. Permission is granted to quote brief passages from this publication in reviews provided the customary acknowledgement of the source is given.

Republication, systematic copying, or multiple reproduction of any material in this publication (including abstracts) is permitted only under license from the American Mathematical Society. Requests for such permission should be addressed to the Manager of Editorial Services, American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248.

The appearance of the code on the first page of an article in this journal indicates the copyright owner's consent for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law, provided that the fee of $1.00 plus $.25 per page for each copy be paid directly to the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.

Bulletin (New Series) of the American Mathematical Society is published quarterly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2213. Second-class postage is paid at Providence, Rhode Island and additional mailing offices. Postmaster: Send address changes to Bulletin, American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248.

Copyright © 1992 American Mathematical Society. All rights reserved.
Printed in the United States of America.
The paper used in this book is acid-free and falls within the guidelines
established to ensure permanence and durability. ♾
This publication was typeset using $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX,
the American Mathematical Society's TEX macro system.

10 9 8 7 6 5 4 3 2 1 · 97 96 95 94 93 92

INDEX TO VOLUME 27

July–October 1992

RESEARCH-EXPOSITORY PAPERS

Abhyankar, Shreeram S. *Galois theory on the line in nonzero characteristic*, 68

Crandall, Michael G., Ishii, Hitoshi, and Lions, Pierre-Louis. *User's guide to viscosity solutions of second order partial differential equations*, 1

Hunt, Brian R., Sauer, Tim, and Yorke, James A. *Prevelance: A translation-invariant "almost every" on infinite-dimensional spaces*, 217

Ishii, Hitoshi. *See* Crandall, Michael G.

Lions, Pierre-Louis. *See* Crandall, Michael G.

McMullen, Curt. *Riemann surfaces and the geometrization of 3-manifolds*, 207

Sauer, Tim. *See* Hunt, Brian R.

Yorke, James A. *See* Hunt, Brian R.

RESEARCH ANNOUNCEMENTS

Alon, Noga and Kleitman, Daniel J. *Piercing convex sets*, 252

Basmajian, Ara. *Generalizing the hyperbolic collar lemma*, 154

Damek, Ewa and Ricci, Fulvio. *A class of nonsymmetric harmonic Riemannian spaces*, 139

Elliott, P. D. T. A. *Additive functions on shifted primes*, 273

Eremenko, A. *A counterexample to the Arakelyan conjecture*, 159

Gesztesy, F., Karwowski, W., and Zhao, Z. *New types of soliton solutions*, 266

Gordon, Carolyn, Webb, David L., and Wolpert, Scott. *One cannot hear the shape of a drum*, 134

Grove, Karsten and Markvorsen, Steen. *Curvature, triameter, and beyond*, 261

Hastings, S. P. and Troy, W. C. *A shooting approach to the Lorenz equations*, 298

Hodgson, Craig D., Rivin, Igor, and Smith, Warren D. *A characterization of convex hyperbolic polyhedra and of convex polyhedra inscribed in the sphere*, 246

Hoehnke, H.-J. and Johnson, K. W. *The 1-, 2-, and 3-characters determine a group*, 243

Ivanov, Sergei V. *On the Burnside problem on periodic groups*, 257

Johnson, K. W. *See* Hoehnke, H.-J.

Karwowski, W. *See* Gesztesy, F.

Kleitman, Daniel J. *See* Alon, Noga

Krushkal, Samuel L. *The Green function of Teichmüller spaces with applications*, 143

Lagarias, Jeffrey C. and Shor, Peter W. *Keller's cube-tiling conjecture is false in high dimensions*, 279

Lohkamp, Joachim. *Negatively Ricci curved manifolds*, 288

Markvorsen, Steen. *See* Grove, Karsten

Martino, John and Priddy, Stewart. *A classification of the stable type of BG*, 165

McLeod, B. *See* Smoller, J.

Priddy, Stewart. *See* Martino, John

Ricci, Fulvio. *See* Damek, Ewa

Rivin, Igor. *See* Hodgson, Craig D.

Rogers, James T., Jr. *Is the boundary of a Siegel disk a Jordan curve?*, 284

Shor, Peter W. *See* Lagarias, Jeffrey C.

Smith, Warren D. *See* Hodgson, Craig D.

Smoller, J., Wasserman, A., Yau, S. T., and McLeod, B. *Smooth static solutions of the Einstein-Yang/Mills equation*, 239

Troy, W. C. *See* Hastings, S. P.

Wang, Xiaolu. *Voiculescu theorem, Sobolev lemma, and extensions of smooth algebras*, 292

Wasserman, A. *See* Smoller, J.

Webb, David L. *See* Gordon, Carolyn

Wilf, Herbert S. and Zeilberger, Doron. *Rational function certification of multisum/integral/"q" identities*, 148

Wolpert, Scott. *See* Gordon, Carolyn

Yau, S. T. *See* Smoller, J.

Zeilberger, Doron. *See* Wilf, Herbert S.

Zhao, Z. *See* Gesztesy, F.

INDEX TO VOLUME 27

BOOK REVIEWS

Audin, Michèle. *The topology of torus actions on symplectic manifolds*, reviewed by Viktor L. Ginzburg, 315

Chai, Ching-Li. *See* Faltings, Gerd

Faltings, Gerd and Chai, Ching-Li. *Degeneration of abelian varieties*, reviewed by Michael Raynaud and Translated by K. Ribet, 183

Garrett, Paul. *Errata to Holomorphic Hilbert modular forms*, reviewed by Michael Harris, 204

Geller, Darryl. *Analytic pseudodifferential operators for the Heisenberg group and local solvability*, reviewed by L. Boutet de Monvel, 332

Gray, Alfred. *Tubes*, reviewed by John Douglas Moore, 311

Grinrod, Peter. *Patterns and waves: The theory and applications of reaction-diffusion equations*, reviewed by G. S. Gill, 326

Horn, Roger A. and Johnson, Charles R. *Topics in matrix analysis*, reviewed by Marvin Marcus, 191

Johnson, Charles R. *See* Horn, Roger A.

Karpilovsky, Gregory. *Symmetric and G-algebras (with applications to group representations)*, reviewed by Morton E. Harris, 203

Łojasiewicz, Stanislaw. *Introduction to complex analytic geometry*, reviewed by Michel Hervé, 323

Mahmoud, Hosam M. *Evolution of random search trees*, reviewed by David Aldous, 313

Margulis, G. A. *Discrete subgroups of semisimple Lie groups*, reviewed by Robert J. Zimmer, 198

Masani, P. R. *Norbert Wiener* 1894–1964, reviewed by J. L. Doob, 304

Mishchenko, A. S., Shatalov, V. E., and Sternin, B. Yu. *Lagrangian manifolds and the Maslov operator*, reviewed by J. J. Duistermaat, 174

Moreno, C. J. *Algebraic curves over finite fields*, reviewed by J. W. P. Hirschfeld, 327

Petrie, T. and Randall, J. *Connections, definite forms and four-manifolds*, reviewed by Robert E. Gompf, 179

Randall, J. *See* Petrie, T.

Samoilenko, Yu. S. *Spectral theory of families of self-adjoint operators*, reviewed by Alfredo Octavio, 171

Sane, Sharad S. *See* Shrikhande, Mohan S.

Shatalov, V. E. *See* Mishchenko, A. S.

Schmidt, Klaus. *Algebraic ideas in ergodic theory*, reviewed by J. Feldman, 189

Shrikhande, Mohan S. and Sane, Sharad S. *Quasi-symmetric designs*, reviewed by A. R. Calderbank, 337

Sternin, B. Yu. *See* Mishchenko, A. S.

Straughan, Brian. *The energy method, stability, and nonlinear convection*, reviewed by Howard Levine, 320

Tsfasman, M. A. and Vlăduţ, S. G. *Algebraic-geometric codes*, reviewed by J. H. van Lint, 306

Vlăduţ, S. G. *See* Tsfasman, M. A.

VOLUME 27 1992

BULLETIN
(NEW SERIES)
OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITORS

Richard S. Palais, *Research-Expository Papers*
Murray Protter, *Book Reviews*
Frank Quinn, *Research Announcements*

PROVIDENCE, RHODE ISLAND USA
ISSN 0273-0979

Bulletin (New Series) of the American Mathematical Society

This journal is devoted to articles of the following types:

Research-Expository Papers

These are, by definition, papers that present a clear and insightful exposition of significant aspects of contemporary mathematical research. Gibbs lectures, Progress in Mathematics lectures, and retiring presidential addresses will be included in this section.

Research Announcements

The purpose of this department is to publish quickly and disseminate widely significant new mathematics. A Research Announcement should be designed to communicate its contents to a broad mathematical audience and should meet high standards for clarity as well as mathematical content.

Book Reviews

Book Reviews are accepted for publication by invitation only. Unsolicited manuscripts will not be considered.

Subscription information. *Bulletin (New Series) of the American Mathematical Society* is published quarterly. Subscription prices for Volumes 26 and 27 (1992) are $202 list, $162 institutional member, $121 individual member. The subscription price for members is included in the annual dues. A late charge of 10% of the subscription price will be imposed upon orders received from nonmembers after January 1 of the subscription year. Subscribers outside the United States and India must pay a postage surcharge of $8.00; subscribers in India must pay a postage surcharge of $13.00. Expedited delivery to destinations in North America $12; elsewhere $21. Beginning in January 1992, the Bulletin will be available from the electronic service e-MATH [**telnet e-MATH.ams.com** (or **telnet 130.44.1.100**). Login and password are **e-math**.]

Back number information. For back issues see the *AMS Catalog of Publications.*

Subscriptions and orders should be addressed to the American Mathematical Society, P. O. Box 1571, Annex Station, Providence, RI 02901-1571. *All orders must be accompanied by payment.* Other correspondence should be addressed to P. O. Box 6248, Providence, RI 02940-6248.

Copying and reprinting. Individual readers of this publication, and nonprofit libraries acting for them, are permitted to make fair use of the material, such as to copy an article for use in teaching or research. Permission is granted to quote brief passages from this publication in reviews provided the customary acknowledgement of the source is given.

Republication, systematic copying, or multiple reproduction of any material in this publication (including abstracts) is permitted only under license from the American Mathematical Society. Requests for such permission should be addressed to the Manager of Editorial Services, American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248.

The appearance of the code on the first page of an article in this journal indicates the copyright owner's consent for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law, provided that the fee of $1.00 plus $.25 per page for each copy be paid directly to the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.

Bulletin (New Series) of the American Mathematical Society is published quarterly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2213. Second-class postage is paid at Providence, Rhode Island and additional mailing offices. Postmaster: Send address changes to Bulletin, American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248.

Copyright © 1992 American Mathematical Society. All rights reserved.
Printed in the United States of America.
The paper used in this book is acid-free and falls within the guidelines
established to ensure permanence and durability. ♾
This publication was typeset using $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX,
the American Mathematical Society's TEX macro system.

10 9 8 7 6 5 4 3 2 1 97 96 95 94 93 92

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY

CONTENTS JULY 1992

Research-Expository Papers

User's guide to viscosity solutions of second order partial differential equations *by Michael G. Crandall, Hitoshi Ishii, and Pierre-Louis Lions* 1
Galois theory on the line in nonzero characteristic *by Shreeram S. Abhyankar* 68

Research Announcements

One cannot hear the shape of a drum *by Carolyn Gordon, David L. Webb, and Scott Wolpert* 134
A class of nonsymmetric harmonic Riemannian spaces *by Ewa Damek and Fulvio Ricci* 139
The Green function of Teichmüller spaces with applications *by Samuel L. Krushkal* 143
Rational function certification of multisum/integral/"q" identities *by Herbert S. Wilf and Doron Zeilberger* 148
Generalizing the hyperbolic collar lemma *by Ara Basmajian* 154
A counterexample to the Arakelyan conjecture *by A. Eremenko* 159
A classification of the stable type of *BG by John Martino and Stewart Priddy* 165

Book Reviews

Spectral theory of families of self-adjoint operators *by Yu. S. Samoilenko*—**Reviewed by** *Alfredo Octavio* 171
Lagrangian manifolds and the Maslov operator *by A. S. Mishchenko, V. E. Shatalov, and B. Yu. Sternin*—**Reviewed by** *J. J. Duistermaat* 174
Connections, definite forms and four-manifolds *by T. Petrie and J. Randall*—**Reviewed by** *Robert E. Gompf* 179
Degeneration of abelian varieties *by Gerd Faltings and Ching-Li Chai*—**Reviewed by** *Michael Raynaud and* Translated by *K. Ribet* 183
Algebraic ideas in ergodic theory *by Klaus Schmidt*—**Reviewed by** *J. Feldman* ... 189
Topics in matrix analysis *by Roger A. Horn and Charles R. Johnson*—**Reviewed by** *Marvin Marcus* 191
Discrete subgroups of semisimple Lie groups *by G. A. Margulis*—**Reviewed by** *Robert J. Zimmer* 198
Symmetric and G-algebras (with applications to group representations) *by Gregory Karpilovsky*—**Reviewed by** *Morton E. Harris* 203
Errata to Holomorphic Hilbert modular forms *by Paul Garrett*—**Reviewed by** *Michael Harris* 204

CONTENTS OCTOBER 1992

Research-Expository Papers

Riemann surfaces and the geometrization of 3-manifolds *by Curt McMullen* 207
Prevelance: A translation-invariant "almost every" on infinite-dimensional spaces *by Brian R. Hunt, Tim Sauer, and James A. Yorke* 217

Research Announcements

Smooth static solutions of the Einstein-Yang/Mills equation *by J. Smoller, A. Wasserman, S. T. Yau, and B. McLeod* 239
The 1-, 2-, and 3-characters determine a group *by H.-J. Hoehnke and K. W. Johnson* 243
A characterization of convex hyperbolic polyhedra and of convex polyhedra inscribed in the sphere *by Craig D. Hodgson, Igor Rivin, and Warren D. Smith* 246
Piercing convex sets *by Noga Alon and Daniel J. Kleitman* 252
On the Burnside problem on periodic groups *by Sergei V. Ivanov* 257
Curvature, triameter, and beyond *by Karsten Grove and Steen Markvorsen* 261
New types of soliton solutions *by F. Gesztesy, W. Karwowski, and Z. Zhao* 266
Additive functions on shifted primes *by P. D. T. A. Elliott* 273
Keller's cube-tiling conjecture is false in high dimensions *by Jeffrey C. Lagarias and Peter W. Shor* 279
Is the boundary of a Siegel disk a Jordan curve? *by James T. Rogers Jr.* 284
Negatively Ricci curved manifolds *by Joachim Lohkamp* 288
Voiculescu theorem, Sobolev lemma, and extensions of smooth algebras *by Xiaolu Wang* 292
A shooting approach to the Lorenz equations *by S. P. Hastings and W. C. Troy* . 298

Book Reviews

Norbert Wiener 1894–1964 *by P. R. Masani*—**Reviewed by** *J. L. Doob* 304
Algebraic-geometric codes *by M. A. Tsfasman and S. G. Vlăduţ*—**Reviewed by** *J. H. van Lint* 306
Tubes *by Alfred Gray*—**Reviewed by** *John Douglas Moore* 311
Evolution of random search trees *by Hosam M. Mahmoud*—**Reviewed by** *David Aldous* 313
The topology of torus actions on symplectic manifolds *by Michèle Audin*—**Reviewed by** *Viktor L. Ginzburg* 315
The energy method, stability, and nonlinear convection *by Brian Straughan*—**Reviewed by** *Howard Levine* 320
Introduction to complex analytic geometry *by Stanislaw Łojasiewicz*—**Reviewed by** *Michel Hervé* 323
Patterns and waves: The theory and applications of reaction-diffusion equations *by Peter Grinrod*—**Reviewed by** *G. S. Gill* 326
Algebraic curves over finite fields *by C. J. Moreno*—**Reviewed by** *J. W. P. Hirschfeld* 327
Analytic pseudodifferential operators for the Heisenberg group and local solvability *by Darryl Geller*—**Reviewed by** *L. Boutet de Monvel* 332
Quasi-symmetric designs *by Mohan S. Shrikhande and Sharad S. Sane*—**Reviewed by** *A. R. Calderbank* 337

Editorial Board for Research-Expository Papers

Persi Diaconis
Jerry Kazdan
Barry Mazur
Richard S. Palais, Chair
David A. Vogan, Jr.
Alan D. Weinstein
Guido L. Weiss

Editorial Board for Research Announcements

Gregory L. Cherlin
William G. Dwyer
Charles L. Epstein
Daniel S. Freed
Michael D. Fried
Zoltan Furedi
Harry Kesten
Robert Lazarsfeld
Paul S. Muhly
Frank S. Quinn, Chair

Book Reviews Editor: Murray H. Protter

Managing Editor: Frank S. Quinn

Editorial Information

As of August 1, 1992, the backlog for this journal was approximately 2 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.

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 to Authors

For Research-Expository Papers and Research Announcements, 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* should be a brief technical description of the new material. Then, for Research Announcements, there should be an introductory section addressed to nonexperts describing the motivation, background, and significance of the results announced. Following the statement of results, there should follow a sketch of proofs which may be addressed to experts. An announcement should not exceed 7 published pages, and preferably not exceed 5 pages. For Research-Expository Papers and Research Announcements, 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. Authors are encouraged to supply electronic addresses when 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 $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX or $\mathcal{A}\mathcal{M}\mathcal{S}$-LATEX 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 $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX and the amsart style of $\mathcal{A}\mathcal{M}\mathcal{S}$-LATEX, 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.

Guidelines for Preparing Electronic Manuscripts provide additional assistance and are available for use with either $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX or $\mathcal{A}\mathcal{M}\mathcal{S}$-LATEX. Authors with FTP access may obtain these *Guidelines* from the Society's Internet node e-MATH.ams.com (130.44.1.100). For those without FTP access they can be obtained free of charge from the e-mail address guide-elec@math.ams.com (Internet) or from the Publications Department, P. O. Box 6248, Providence, RI 02940-6248. When requesting *Guidelines* please specify which version you want.

Electronic manuscripts should be sent to the Providence office only after the paper has been accepted for publication. Please send electronically prepared manuscript files via e-mail to pub-submit@math.ams.com (Internet) or on diskettes to the Publications Department address listed above. When submitting electronic manuscripts please be sure to include a message indicating in which publication the paper has been accepted.

Copies of the paper should be sent directly to the appropriate Editor and the author should keep one copy. At that time authors should indicate if the paper has been prepared using $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX or $\mathcal{A}\mathcal{M}\mathcal{S}$-LATEX. For Research-Expository papers, two copies of the manuscript should be submitted to Professor Richard S. Palais, Department of Mathematics, Brandeis University, Waltham, MA 02154-9110. For Research Announcements, four copies of the manuscript should be submitted to Professor Frank Quinn, Department of Mathematics, Virginia Tech, Blacksburg, VA 24061-0123. Research Announcements can also be submitted electronically in the standard TEX formats to bams@vtmath.math.vt.edu. 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.com or from AMS, Customer Services Department, P. O. Box 6248, Providence, RI 02940-6248.

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.

Remarks on Research Announcements

The circulation of the *Bulletin* is larger by an order of magnitude than that of most research mathematics journals; it is received by essentially every

member of the Society. Space is limited to around 40 Announcements each year. These facts largely determine the qualities looked for in an Announcement:

The results should be, roughly speaking, among the 40 most significant or interesting achievements in mathematics in the year. The paper should contain background material for nonexperts which indicates why the results are significant and interesting.

The paper should be addressed to as wide an audience as possible, not just to experts. Strive for clarity and precision. Avoid jargon and introduce the terminology necessary to understand the main results. If space considerations prevent a full development, delineate clearly what is not being explained and provide references. The proof sketch can be more technical.

Ask a colleague to review your manuscript before you submit it. Even better, ask two colleagues, one whose work is close to yours, one whose work is farther away. (If you can't get two people you know to read your work before it is published, how many will want to read it after?) Ask for suggestions on how to improve the readability.

An abstract and the 1991 Mathematics Subject Classification are required. Papers submitted without these will be delayed.

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY

CONTENTS OCTOBER 1992

Research-Expository Papers

Riemann surfaces and the geometrization of 3-manifolds *by Curt McMullen* 207
Prevelance: A translation-invariant "almost every" on infinite-dimensional spaces *by Brian R. Hunt, Tim Sauer, and James A. Yorke* 217

Research Announcements

Smooth static solutions of the Einstein-Yang/Mills equation *by J. Smoller, A. Wasserman, S. T. Yau, and B. McLeod* 239
The 1-, 2-, and 3-characters determine a group *by H.-J. Hoehnke and K. W. Johnson* 243
A characterization of convex hyperbolic polyhedra and of convex polyhedra inscribed in the sphere *by Craig D. Hodgson, Igor Rivin, and Warren D. Smith* 246
Piercing convex sets *by Noga Alon and Daniel J. Kleitman* 252
On the Burnside problem on periodic groups *by Sergei V. Ivanov* 257
Curvature, triameter, and beyond *by Karsten Grove and Steen Markvorsen* 261
New types of soliton solutions *by F. Gesztesy, W. Karwowski, and Z. Zhao* 266
Additive functions on shifted primes *by P. D. T. A. Elliott* 273
Keller's cube-tiling conjecture is false in high dimensions *by Jeffrey C. Lagarias and Peter W. Shor* 279
Is the boundary of a Siegel disk a Jordan curve? *by James T. Rogers Jr.* 284
Negatively Ricci curved manifolds *by Joachim Lohkamp* 288
Voiculescu theorem, Sobolev lemma, and extensions of smooth algebras *by Xiaolu Wang* 292
A shooting approach to the Lorenz equations *by S. P. Hastings and W. C. Troy* . 298

Book Reviews

Norbert Wiener 1894–1964 *by P. R. Masani*—**Reviewed by** *J. L. Doob* 304
Algebraic-geometric codes *by M. A. Tsfasman and S. G. Vlăduţ*—**Reviewed by** *J. H. van Lint* 306
Tubes *by Alfred Gray*—**Reviewed by** *John Douglas Moore* 311
Evolution of random search trees *by Hosam M. Mahmoud*—**Reviewed by** *David Aldous* 313
The topology of torus actions on symplectic manifolds *by Michèle Audin*—**Reviewed by** *Viktor L. Ginzburg* 315
The energy method, stability, and nonlinear convection *by Brian Straughan*—**Reviewed by** *Howard Levine* 320
Introduction to complex analytic geometry *by Stanislaw Łojasiewicz*—**Reviewed by** *Michel Hervé* 323
Patterns and waves: The theory and applications of reaction-diffusion equations *by Peter Grinrod*—**Reviewed by** *G. S. Gill* 326
Algebraic curves over finite fields *by C. J. Moreno*—**Reviewed by** *J. W. P. Hirschfeld* 327
Analytic pseudodifferential operators for the Heisenberg group and local solvability *by Darryl Geller*—**Reviewed by** *L. Boutet de Monvel* 332
Quasi-symmetric designs *by Mohan S. Shrikhande and Sharad S. Sane*—**Reviewed by** *A. R. Calderbank* 337