

JOURNAL OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITORS

Bernd Sturmfels Ingrid Daubechies Lawrence C. Evans Robert Lazarsfeld Andrei Okounkov

ASSOCIATE EDITORS

Francis Bonahon F. Michael Christ Constantine M. Dafermos Weinan E Michael J. Hopkins Ehud Hrushovski Alexander S. Kechris Grigorii A. Margulis Tomasz S. Mrowka Jonathan M. Rosenberg Oded Schramm Karen E. Smith Richard Stanley Terence Tao Richard L. Taylor S. R. S. Varadhan Efim Zelmanov

PROVIDENCE, RHODE ISLAND USA

ISSN 0894-0347

Shou-Wu Zhang

Journal of the American Mathematical Society

This journal is devoted to research articles of the highest quality in all areas of pure and applied mathematics.

Submission information. See Information for Authors at the end of this issue.

Publisher Item Identifier. The Publisher Item Identifier (PII) appears at the top of the first page of each article published in this journal. This alphanumeric string of characters uniquely identifies each article and can be used for future cataloging, searching, and electronic retrieval.

Postings to the AMS website. Articles are posted to the AMS website individually after proof is returned from authors and before appearing in an issue.

Subscription information. The Journal of the American Mathematical Society is published quarterly. Beginning January 1996 the Journal of the American Mathematical Society is accessible from www.ams.org/publications/. Subscription prices for Volume 16 (2003) are as follows: for paper delivery, \$246 list, \$197 institutional member, \$221 corporate member, \$148 individual member; for electronic delivery, \$221 list, \$177 institutional member, \$199 corporate member, \$133 individual member. Upon request, subscribers to paper delivery of this journal are also entitled to receive electronic delivery. If ordering the paper version, add \$11 for surface delivery outside the United States and India; \$18 to India. Expedited delivery to destinations in North America is \$16; elsewhere \$40. For paper delivery a late charge of 10% of the subscription price will be imposed upon orders received from nonmembers after January 1 of the subscription year.

Back number information. For back issues see www.ams.org/bookstore.

Subscriptions and orders should be addressed to the American Mathematical Society, P.O. Box 845904, Boston, MA 02284-5904 USA. *All orders must be accompanied by payment*. Other correspondence should be addressed to 201 Charles Street, Providence, RI 02904-2294 USA.

Copying and reprinting. Material in this journal may be reproduced by any means for educational and scientific purposes without fee or permission with the exception of reproduction by services that collect fees for delivery of documents and provided that the customary acknowledgment of the source is given. This consent does not extend to other kinds of copying for general distribution, for advertising or promotional purposes, or for resale. Requests for permission for commercial use of material should be addressed to the Acquisitions Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. Requests can also be made by e-mail to reprint-permission@ams.org.

Excluded from these provisions is material in articles for which the author holds copyright. In such cases, requests for permission to use or reprint should be addressed directly to the author(s). (Copyright ownership is indicated in the notice in the lower right-hand corner of the first page of each article.)

The Journal of the American Mathematical Society is published quarterly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2294 USA and is mailed from Providence, Rhode Island. Periodicals postage is paid at Providence, Rhode Island. Postmaster: Send address changes to Journal of the AMS, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.

^{© 2003} by the American Mathematical Society. All rights reserved. This journal is indexed in *Mathematical Reviews, Zentralblatt MATH, Science Citation Index*[®], *Science Citation Index*TM–Expanded, ISI Alerting ServicesSM, CompuMath Citation Index[®], and Current Contents[®]/Physical, Chemical & Earth Sciences.

Printed in the United States of America.

[⊗] The paper used in this journal is acid-free and falls within the guidelines established to ensure permanence and durability.

JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY CONTENTS

Vol. 16, No. 4 October 2	2003
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-	
Carleman classes and o-minimality	751
Carles Broto, Ran Levi, and Bob Oliver, The homotopy theory of fusion	
systems	779
Curtis T. McMullen, Billiards and Teichmüller curves on Hilbert modular	
surfaces	857
Sean Keel and Lorenzo Sadun, Oort's conjecture for $A_q \otimes \mathbb{C}$	887
Anders Skovsted Buch, Andrew Kresch, and Harry Tamvakis,	
Gromov-Witten invariants on Grassmannians	901
Gregory Lawler, Oded Schramm, and Wendelin Werner, Conformal	
restriction: The chordal case	917
Alexander Barvinok and Kevin Woods, Short rational generating	
functions for lattice point problems	957
Bjorn Poonen, Hilbert's Tenth Problem and Mazur's Conjecture for large	
subrings of $\mathbb Q$	981
Stefan Wewers, Three point covers with bad reduction	991

INDEX TO VOLUME 16 (2003)

Andrews, Ben. Classification of limiting shapes for isotropic curve flows, 443

Barvinok, Alexander, and Woods, Kevin. Short rational generating functions for lattice point problems, 957

Belegradek, Igor, and Kapovitch, Vitali. Obstructions to nonnegative curvature and rational homotopy theory, 259

Bourgain, Jean, and Brezis, Haïm. On the equation div Y=f and application to control of phases, 393

Brezis, Haïm. See Bourgain, Jean

Brock, Jeffrey F. The Weil-Petersson metric and volumes of 3-dimensional hyperbolic convex cores, 495

Broto, Carles, Levi, Ran, and Oliver, Bob. The homotopy theory of fusion systems, 779

Brundan, Jonathan. Kazhdan-Lusztig polynomials and character formulae for the Lie superalgebra $\mathfrak{gl}(m|n)$, 185

Buch, Anders Skovsted, Kresch, Andrew, and Tamvakis, Harry. Gromov-Witten invariants on Grassmannians, 901

Buechler, Steven, and Lessmann, Olivier. Simple homogeneous models, 91

Buzzard, Kevin. Analytic continuation of overconvergent eigenforms, 29

Chen, Gui-Qiang, and Feldman, Mikhail. Multidimensional transonic shocks and free boundary problems for nonlinear equations of mixed type, 461

Colliander, J., Keel, M., Staffilani, G., Takaoka, H., and Tao, T. Sharp global well-posedness for KdV and modified KdV on \mathbb{R} and \mathbb{T} , 705

Eisenbud, David, Schreyer, Frank-Olaf, and Appendix by Weyman, Jerzy. Resultants and Chow forms via exterior syzygies, 537

Feldman, Mikhail. See Chen, Gui-Qiang

Graber, Tom, Harris, Joe, and Starr, Jason. Families of rationally connected varieties, 57

Harris, Joe. See Graber, Tom

Hausel, Tamás, and Thaddeus, Michael. Relations in the cohomology ring of the moduli space of rank 2 Higgs bundles, 303

Kapovitch, Vitali. See Belegradek, Igor

Kawakita, Masayuki. General elephants of three-fold divisorial contractions, 331

Keel, M. See Colliander, J.

Keel, Sean, and Sadun, Lorenzo. *Oort's conjecture for* $A_q \otimes \mathbb{C}$, 887

Kim, Henry H., Appendix 1 by Ramakrishnan, Dinakar, and Appendix 2 by Kim, Henry H. and Sarnak, Peter. Functoriality for the exterior square of GL_4 and the symmetric fourth of GL_2 , 139

Kresch, Andrew. See Buch, Anders Skovsted

Lawler, Gregory, Schramm, Oded, and Werner, Wendelin. Conformal restriction: The chordal case, 917

Lessmann, Olivier. See Buechler, Steven

Levi, Ran. See Broto, Carles

Mateu, Joan, Tolsa, Xavier, and Verdera, Joan. The planar Cantor sets of zero analytic capacity and the local T(b)-Theorem, 19

McClure, James E., and Smith, Jeffrey H. Multivariable cochain operations and little n-cubes, 681

McMullen, Curtis T. Billiards and Teichmüller curves on Hilbert modular surfaces, 857

Okounkov, Andrei, and Reshetikhin, Nikolai. Correlation function of Schur process with application to local geometry of a random 3-dimensional Young diagram, 581

Oliver, Bob. See Broto, Carles

Pareschi, Giuseppe, and Popa, Mihnea. Regularity on abelian varieties I, 285

Poltoratski, Alexei. Maximal properties of the normalized Cauchy transform, 1

Poonen, Bjorn. Hilbert's Tenth Problem and Mazur's Conjecture for large subrings of Q, 981

Popa, Mihnea. See Pareschi, Giuseppe

Ramakrishnan, Dinakar. See Kim, Henry H.

Reshetikhin, Nikolai. See Okounkov, Andrei

Rietsch, Konstanze. Totally positive Toeplitz matrices and quantum cohomology of partial flag varieties, 363

Roberts, R., Shareshian, J., and Stein, M. Infinitely many hyperbolic 3-manifolds which contain no Reebless foliation, 639

INDEX TO VOLUME 16 (2003)

Rolin, J.-P., Speissegger, P., and Wilkie, A. J. Quasianalytic Denjoy-Carleman classes and o $minimality,\ 751$

Sadun, Lorenzo. See Keel, Sean

Sarnak, Peter. See Kim, Henry H.

Schramm, Oded. See Lawler, Gregory

Schreyer, Frank-Olaf. See Eisenbud, David

Shareshian, J. See Roberts, R.

Smith, Jeffrey H. See McClure, James E.

Speissegger, P. See Rolin, J.-P.

Staffilani, G. See Colliander, J.

Starr, Jason. See Graber, Tom

Stein, M. See Roberts, R.

Sundberg, Carl. Measures induced by analytic functions and a problem of Walter Rudin, 69

 $Swartz, \ E. \quad \textit{Topological representations of matroids}, \ 427$

Takaoka, H. See Colliander, J.

Tamvakis, Harry. See Buch, Anders Skovsted

Tao, T. See Colliander, J.

Tao, Terence, and Wright, James. L^p improving bounds for averages along curves, 605

Thaddeus, Michael. See Hausel, Tamás

Thomas, Simon. The classification problem for torsion-free abelian groups of finite rank, 233

Tolsa, Xavier. See Mateu, Joan

Verdera, Joan. See Mateu, Joan

Werner, Wendelin. See Lawler, Gregory

Wewers, Stefan. Three point covers with bad reduction, 991 Weyman, Jerzy. See Eisenbud, David

White, Brian. The nature of singularities in mean curvature flow of mean-convex sets, 123

Wilkie, A. J. See Rolin, J.-P.

Woods, Kevin. See Barvinok, Alexander

Wright, James. See Tao, Terence



AMERICAN MATHEMATICAL SOCIETY

EDITORS

Bernd Sturmfels Ingrid Daubechies Lawrence C. Evans Robert Lazarsfeld Andrei Okounkov

ASSOCIATE EDITORS

Francis Bonahon F. Michael Christ Constantine M. Dafermos Weinan E Michael J. Hopkins Ehud Hrushovski Alexander S. Kechris Grigorii A. Margulis Tomasz S. Mrowka Jonathan M. Rosenberg Oded Schramm Karen E. Smith Richard Stanley Terence Tao Richard L. Taylor S. R. S. Varadhan Efim Zelmanov Shou-Wu Zhang

PROVIDENCE, RHODE ISLAND USA

Journal of the American Mathematical Society

This journal is devoted to research articles of the highest quality in all areas of pure and applied mathematics.

Submission information. See Information for Authors at the end of this issue.

Publisher Item Identifier. The Publisher Item Identifier (PII) appears at the top of the first page of each article published in this journal. This alphanumeric string of characters uniquely identifies each article and can be used for future cataloging, searching, and electronic retrieval.

Postings to the AMS website. Articles are posted to the AMS website individually after proof is returned from authors and before appearing in an issue.

Subscription information. The Journal of the American Mathematical Society is published quarterly. Beginning January 1996 the Journal of the American Mathematical Society is accessible from www.ams.org/publications/. Subscription prices for Volume 16 (2003) are as follows: for paper delivery, \$246 list, \$197 institutional member, \$221 corporate member, \$148 individual member; for electronic delivery, \$221 list, \$177 institutional member, \$199 corporate member, \$133 individual member. Upon request, subscribers to paper delivery of this journal are also entitled to receive electronic delivery. If ordering the paper version, add \$11 for surface delivery outside the United States and India; \$18 to India. Expedited delivery to destinations in North America is \$16; elsewhere \$40. For paper delivery a late charge of 10% of the subscription price will be imposed upon orders received from nonmembers after January 1 of the subscription year.

Back number information. For back issues see www.ams.org/bookstore.

Subscriptions and orders should be addressed to the American Mathematical Society, P.O. Box 845904, Boston, MA 02284-5904 USA. *All orders must be accompanied by payment*. Other correspondence should be addressed to 201 Charles Street, Providence, RI 02904-2294 USA.

Copying and reprinting. Material in this journal may be reproduced by any means for educational and scientific purposes without fee or permission with the exception of reproduction by services that collect fees for delivery of documents and provided that the customary acknowledgment of the source is given. This consent does not extend to other kinds of copying for general distribution, for advertising or promotional purposes, or for resale. Requests for permission for commercial use of material should be addressed to the Acquisitions Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. Requests can also be made by e-mail to reprint-permission@ams.org.

Excluded from these provisions is material in articles for which the author holds copyright. In such cases, requests for permission to use or reprint should be addressed directly to the author(s). (Copyright ownership is indicated in the notice in the lower right-hand corner of the first page of each article.)

The Journal of the American Mathematical Society is published quarterly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2294 USA and is mailed from Providence, Rhode Island. Periodicals postage is paid at Providence, Rhode Island. Postmaster: Send address changes to Journal of the AMS, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.

^{© 2003} by the American Mathematical Society. All rights reserved. This journal is indexed in *Mathematical Reviews, Zentralblatt MATH, Science Citation Index*[®], *Science Citation Index*TM–Expanded, ISI Alerting ServicesSM, CompuMath Citation Index[®], and Current Contents[®]/Physical, Chemical & Earth Sciences.

Printed in the United States of America.

[⊗] The paper used in this journal is acid-free and falls within the guidelines established to ensure permanence and durability.

JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY CONTENTS

Vol. 16, No. 1 January 2	1003
Alexei Poltoratski, Maximal properties of the normalized Cauchy transform	1
Joan Mateu, Xavier Tolsa, and Joan Verdera, The planar Cantor sets of zero analytic capacity and the local $T(b)$ -Theorem	19
Kevin Buzzard, Analytic continuation of overconvergent eigenforms	29
Tom Graber, Joe Harris, and Jason Starr, Families of rationally connected varieties	57
Carl Sundberg, Measures induced by analytic functions and a problem of Walter Rudin	69
Steven Buechler and Olivier Lessmann, Simple homogeneous models .	91
Brian White, The nature of singularities in mean curvature flow of mean-convex sets	123
Henry H. Kim, with Appendix 1 by Dinakar Ramakrishnan, and Appendix 2 by Henry H. Kim and Peter Sarnak, Functoriality for the exterior square of GL_4 and the symmetric fourth of GL_2 .	139
Jonathan Brundan, Kazhdan-Lusztig polynomials and character formulae for the Lie superalgebra $\mathfrak{gl}(m n)$	185
Simon Thomas, The classification problem for torsion-free abelian groups of finite rank	233
Vol. 16, No. 2 April 2	2003
Igor Belegradek and Vitali Kapovitch, Obstructions to nonnegative curvature and rational homotopy theory	259
Giuseppe Pareschi and Mihnea Popa, Regularity on abelian varieties I	285
Tamás Hausel and Michael Thaddeus, Relations in the cohomology ring of the moduli space of rank 2 Higgs bundles	303
Masayuki Kawakita, General elephants of three-fold divisorial contractions	331
Konstanze Rietsch, Totally positive Toeplitz matrices and quantum cohomology of partial flag varieties	363
Jean Bourgain and Haïm Brezis, On the equation $\operatorname{div} Y = f$ and	
application to control of phases	393
E. Swartz, Topological representations of matroids	427
Ben Andrews, Classification of limiting shapes for isotropic curve flows	443

Vol. 16, No. 3 July 2003

shocks and free boundary problems for nonlinear equations of mixed	
type	461
Jeffrey F. Brock, The Weil-Petersson metric and volumes of 3-dimensional	
hyperbolic convex cores	495
David Eisenbud, Frank-Olaf Schreyer, and Appendix by Jerzy Weyman, Resultants and Chow forms via exterior syzygies	537
Andrei Okounkov and Nikolai Reshetikhin, Correlation function of Schur process with application to local geometry of a random 3-dimensional Young diagram	
Terence Tao and James Wright, L^p improving bounds for averages along curves	
R. Roberts, J. Shareshian, and M. Stein, Infinitely many hyperbolic 3-	
manifolds which contain no Reebless foliation	639
James E. McClure and Jeffrey H. Smith, Multivariable cochain operations and little <i>n</i> -cubes	681
J. Colliander, M. Keel, G. Staffilani, H. Takaoka, and T. Tao, Sharp	
global well-posedness for KdV and modified KdV on \mathbb{R} and \mathbb{T}	705
Vol. 16, No. 4 October	2003
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-	
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy- Carleman classes and o-minimality	751
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality Carles Broto, Ran Levi, and Bob Oliver, The homotopy theory of fusion systems Curtis T. McMullen, Billiards and Teichmüller curves on Hilbert modular	751 779
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality Carles Broto, Ran Levi, and Bob Oliver, The homotopy theory of fusion systems Curtis T. McMullen, Billiards and Teichmüller curves on Hilbert modular surfaces	751 779 857
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779 857 887
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality Carles Broto, Ran Levi, and Bob Oliver, The homotopy theory of fusion systems Curtis T. McMullen, Billiards and Teichmüller curves on Hilbert modular surfaces	751 779 857 887
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779 857 887 901
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779 857 887 901 917
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779 857 887 901 917
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779 857 887 901 917 957
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779 857 887 901 917 957
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-Carleman classes and o-minimality	751 779 857 887 901 917 957

Editors

Bernd Sturmfels
Department of Mathematics
University of California at Berkeley
Berkeley, CA 94720-3840 USA
bernd@math.berkeley.edu

Ingrid Daubechies
Department of Mathematics & PACM
218 Fine Hall
Princeton University
Princeton, NJ 08544-1000 USA
ingrid@math.princeton.edu

Lawrence C. Evans
Department of Mathematics
University of California at Berkeley
Berkeley, CA 94720-3840 USA
evans@math.berkeley.edu

Robert Lazarsfeld Department of Mathematics University of Michigan Ann Arbor, MI 48109-1109 USA rlaz@umich.edu

Andrei Okounkov Department of Mathematics Fine Hall Princeton University Princeton, NJ 08544 USA okounkov@princeton.edu

Associate Editors

Francis Bonahon, University of Southern California F. Michael Christ, University of California, Berkeley Constantine M. Dafermos, Brown University Weinan E, Princeton University Michael J. Hopkins, Massachusetts Institute of Technology Ehud Hrushovski, Hebrew University of Jerusalem Alexander S. Kechris, California Institute of Technology Grigorii A. Margulis, Yale University Tomasz S. Mrowka, Massachusetts Institute of Technology Jonathan M. Rosenberg, University of Maryland Oded Schramm, Microsoft Research Karen E. Smith, University of Michigan Richard Stanley, Massachusetts Institute of Technology Terence Tao, University of California, Los Angeles Richard L. Taylor, Harvard University S. R. S. Varadhan, New York University-Courant Institute Efim Zelmanov, Yale University Shou-Wu Zhang, Columbia University

Assistant to the Editorial Board

Cheryl A. Cantore
Program in Applied and Computational Mathematics
203 Fine Hall, Washington Road
Princeton University
Princeton, NJ 08544 USA
cheryl@princeton.edu

Editorial Information

As of June 30, 2003, 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 four months (the time necessary for editing and composing a typical issue). In an effort to make articles available as quickly as possible, articles are posted to the

AMS website individually after proof is returned from authors and before appearing in an issue.

A Consent to Publish and Copyright Agreement is required before a paper will be published in this journal. After a paper is accepted for publication, the Providence office will send a Consent to Publish and Copyright Agreement to all authors of the paper. 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

Initial submission. Two copies of the paper should be sent directly to one of the Editors (not an Associate Editor), and the author should keep one copy.

IF an editor is agreeable, an electronic manuscript prepared in TeX or LATeX may be submitted by pointing to an appropriate URL on a preprint or e-print server.

The first page must contain a descriptive title that is short, but informative; useless or vague phrases such as "some remarks about" or "concerning" should be avoided. Although an abstract is not required upon initial submission, upon acceptance authors will be requested to supply an abstract for the electronic version of this journal. The AMS offers free worldwide access to the electronic abstracts. An abstract should be at least one complete sentence and at most 300 words. No abstracts will appear in the printed journal starting in 1998. Included with the footnotes to the paper should be the 2000 Mathematics Subject Classification representing the primary and secondary subjects of the article. The classifications are accessible from www.ams.org/msc/. The list of classifications is also available in print starting with the 1999 annual index of Mathematical Reviews. The Mathematics Subject Classification footnote may be followed by a list of key words and phrases describing the subject matter of the article and taken from it. Journal abbreviations used in bibliographies are listed in the latest *Mathematical Reviews* annual index. The series abbreviations are also accessible from www.ams.org/publications/. To help in preparing and verifying references, the AMS offers MR Lookup, a Reference Tool for Linking, at www.ams.org/mrlookup/. 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 electronically prepared manuscripts, with a strong preference for \mathcal{AMS} -IfTeX. To this end, the Society has prepared \mathcal{AMS} -IfTeX author packages for each AMS publication. Author packages include instructions for preparing electronic manuscripts, the AMS Author Handbook, samples, and a style file that generates the particular design specifications of that publication series. Articles properly prepared using the \mathcal{AMS} -IfTeX style file and the \label and \ref commands automatically enable extensive intra-document linking to the bibliography and other elements of the article for searching electronically on the Web. Because linking must often be added manually to electronically prepared manuscripts in other forms of TeX, using \mathcal{AMS} -IfTeX also reduces the amount of technical intervention once the files are received by the AMS. This results in fewer errors in processing and saves the author proofreading time. \mathcal{AMS} -IfTeX papers also move more efficiently through the production stream, helping to minimize publishing costs.

 $\mathcal{A}_{\mathcal{M}}\mathcal{S}$ -EaTeX is the highly preferred format of TeX, but author packages are also available in $\mathcal{A}_{\mathcal{M}}\mathcal{S}$ -TeX. Those authors who make use of these style files from the beginning of the writing process will further reduce their own efforts. Manuscripts prepared electronically in LaTeX or plain TeX are normally not acceptable due to the high amount of technical time required to insure that the file will run properly through the AMS in-house production system. LaTeX users will find that $\mathcal{A}_{\mathcal{M}}\mathcal{S}$ -LaTeX is the same as LaTeX with additional commands to simplify the typesetting of mathematics, and users of plain TeX should have the foundation for learning $\mathcal{A}_{\mathcal{M}}\mathcal{S}$ -LaTeX.

Authors may retrieve an author package from the AMS website starting from www.ams. org/tex/ or via FTP to ftp.ams.org (login as anonymous, enter username as password,

and type cd pub/author-info). The AMS Author Handbook and the Instruction Manual are available in PDF format following the author packages link from www.ams.org/tex/. The author package can also be obtained free of charge by sending email to pub@ams.org (Internet) or from the Publication Division, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. When requesting an author package, please specify AMS-IATEX or AMS-TEX, Macintosh or IBM (3.5) format, and the publication in which your paper will appear. Please be sure to include your complete mailing address.

At the time of submission, authors should indicate if the paper has been prepared using AMS-IATEX or AMS-TEX and provide the Editor with a paper manuscript that matches the electronic manuscript. The final version of the electronic manuscript should be sent to the Providence office immediately after the paper has been accepted for publication. The author should also send the final version of the paper manuscript to the Editor, who will forward a copy to the Providence office. Editors will require authors to send their electronically prepared manuscripts to the Providence office in a timely fashion. Electronically prepared manuscripts can be sent via email to pub-submit@ams.org (Internet) or on diskette to the Electronic Prepress Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. When sending a manuscript electronically, 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. Complete instructions on how to send files are included in the author package.

Electronic graphics. Comprehensive instructions on preparing graphics are available from www.ams.org/jourhtml/authors.html. A few of the major requirements are given here

Submit files for graphics as EPS (Encapsulated PostScript) files. This includes graphics originated via a graphics application as well as scanned photographs or other computer-generated images. If this is not possible, TIFF files are acceptable as long as they can be opened in Adobe Photoshop or Illustrator. No matter what method was used to produce the graphic, it is necessary to provide a paper copy to the AMS.

Authors using graphics packages for the creation of electronic art should also avoid the use of any lines thinner than 0.5 points in width. Many graphics packages allow the user to specify a "hairline" for a very thin line. Hairlines often look acceptable when proofed on a typical laser printer. However, when produced on a high-resolution laser imagesetter, hairlines become nearly invisible and will be lost entirely in the final printing process.

Screens should be set to values between 15% and 85%. Screens which fall outside of this range are too light or too dark to print correctly. Variations of screens within a graphic should be no less than 10%.

AMS policy on making changes to articles after posting. Articles are posted to the AMS website individually after proof is returned from authors and before appearing in an issue. To preserve the integrity of electronically published articles, once an article is individually posted to the AMS website but not yet in an issue, changes cannot be made in place in the paper. However, an "Added after posting" section may be added to the paper right before the References when there is a critical error in the content of the paper. The "Added after posting" section gives the author an opportunity to correct this type of critical error before the article is put into an issue for printing and before it is then reposted with the issue. The "Added after posting" section remains a permanent part of the paper. The AMS does not keep author-related information, such as affiliation, current address, and email address, up to date after a paper is initially posted.

Once the article is assigned to an issue, even if the issue has not yet been posted to the AMS website corrections may be made to the paper by submitting a traditional errata article to the Editor. The errata article will appear in a future print issue and will link back and forth on the web to the original article online.

Secure manuscript tracking on the Web and via email. Authors can track their manuscripts through the AMS journal production process using the personal AMS ID and

Article ID printed in the upper right-hand corner of the Consent to Publish form sent to each author who publishes in AMS journals. Access to the tracking system is available from www.ams.org/mstrack/ or via email sent to mstrack-query@ams.org. To access by email, on the subject line of the message simply enter the AMS ID and Article ID. To track more than one manuscript by email, choose one of the Article IDs and enter the AMS ID and the Article ID followed by the word all on the subject line. An explanation of each production step is provided on the web through links from the manuscript tracking screen. Questions can be sent to jams-query@ams.org.

TeX files available. Beginning with the January 1992 issue of the Bulletin and the January 1996 issues of Transactions, Proceedings, Mathematics of Computation, and the Journal of the AMS, TEX files can be downloaded from the AMS website starting from www.ams.org/journals/. Authors without Web access may request their files at the address given below after the article has been published. For Bulletin papers published in 1987 through 1991 and for Transactions, Proceedings, Mathematics of Computation, and the Journal of the AMS papers published in 1987 through 1995, TeX files are available upon request for authors without Web access by sending email to file-request@ams.org or by contacting the Electronic Prepress Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. The request should include the title of the paper, the name(s) of the author(s), the name of the publication in which the paper has or will appear, and the volume and issue numbers if known. The T_EX file will be sent to the author making the request after the article goes to the printer. If the requestor can receive Internet email, please include the email address to which the file should be sent. Otherwise please indicate a diskette format and postal address to which a disk should be mailed. Note: Because T_FX production at the AMS sometimes requires extra fonts and macros that are not yet publicly available, TFX files cannot be guaranteed to run through the author's version of TeX without errors. The AMS regrets that it cannot provide support to eliminate such errors in the author's TEX environment.

Inquiries. Any inquiries concerning a paper that has been accepted for publication that cannot be answered via the manuscript tracking system mentioned above should be sent to jams-query@ams.org or directly to the Electronic Prepress Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.

JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY CONTENTS

Vol. 16, No. 4 October 2	2003
JP. Rolin, P. Speissegger, and A. J. Wilkie, Quasianalytic Denjoy-	
Carleman classes and o-minimality	751
Carles Broto, Ran Levi, and Bob Oliver, The homotopy theory of fusion	
systems	779
Curtis T. McMullen, Billiards and Teichmüller curves on Hilbert modular	
surfaces	857
Sean Keel and Lorenzo Sadun, Oort's conjecture for $A_g \otimes \mathbb{C}$	887
Anders Skovsted Buch, Andrew Kresch, and Harry Tamvakis,	
Gromov-Witten invariants on Grassmannians	901
Gregory Lawler, Oded Schramm, and Wendelin Werner, Conformal	
restriction: The chordal case	917
Alexander Barvinok and Kevin Woods, Short rational generating	
functions for lattice point problems	957
Bjorn Poonen, Hilbert's Tenth Problem and Mazur's Conjecture for large	
subrings of $\mathbb Q$	981
Stefan Wewers, Three point covers with bad reduction	991



0894-0347(200310)16:4*;1-9