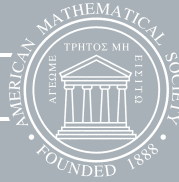


---

VOLUME 136 NUMBER 9



SEPTEMBER 2008

WHOLE NUMBER 591

---

# PROCEEDINGS

OF THE

---

A M E R I C A N M A T H E M A T I C A L S O C I E T Y

---

**EDITED BY**

Mario Bonk  
Richard C. Bradley  
Ted Chinburg  
Peter A. Clarkson  
Walter Craig  
Alexander N. Dranishnikov  
Ronald A. Fintushel,  
    Managing Editor  
Paul Goerss  
Matthew J. Gursky  
Jim Haglund  
Jonathan I. Hall  
Jane M. Hawkins  
Birge Huisgen-Zimmermann  
Marius Junge  
Nigel J. Kalton  
Julia Knight

Bryna Kra  
Michael T. Lacey  
Gail R. Letzter  
Wen-Ching Winnie Li  
Martin Lorenz  
Varghese Mathai  
Ken Ono  
Daniel Ruberman  
Andreas Seeger  
Mei-Chi Shaw  
Hart F. Smith  
Chuu-Lian Terng  
Tatiana Toro  
Bernd Ulrich  
Edward C. Waymire  
Michael I. Weinstein  
Richard A. Wentworth  
Jon G. Wolfson

---

PROVIDENCE, RHODE ISLAND USA

ISSN 0002-9939

*Available electronically at*  
[www.ams.org/proc/](http://www.ams.org/proc/)

## Proceedings of the American Mathematical Society

This journal is devoted entirely to research in 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.** *Proceedings of the American Mathematical Society* is published monthly. Beginning January 1996 *Proceedings* is accessible from [www.ams.org/journals/](http://www.ams.org/journals/). Subscription prices for Volume 136 (2008) are as follows: for paper delivery, US\$1106 list, US\$885 institutional member, US\$995 corporate member, US\$664 individual member; for electronic delivery, US\$995 list, US\$796 institutional member, US\$896 corporate member, US\$597 individual member. Upon request, subscribers to paper delivery of this journal are also entitled to receive electronic delivery. If ordering the paper version, add US\$32 for surface delivery outside the United States and India; US\$49 to India. Expedited delivery to destinations in North America is US\$75; elsewhere US\$118. 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](http://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](mailto: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.)

---

*Proceedings of the American Mathematical Society* (ISSN 0002-9939) is published monthly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2294 USA. Periodicals postage is paid at Providence, Rhode Island. Postmaster: Send address changes to *Proceedings*, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.

© 2008 by the American Mathematical Society. All rights reserved.

This journal is indexed in *Mathematical Reviews*, *Zentralblatt MATH*, *Science Citation Index*<sup>®</sup>, *Science Citation Index*<sup>TM</sup>-*Expanded*, *ISI Alerting Services*<sup>SM</sup>, *CompuMath Citation Index*<sup>®</sup>, and *Current Contents*<sup>®</sup>/*Physical, Chemical & Earth Sciences*. This journal is archived in *Portico*.

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.

10 9 8 7 6 5 4 3 2 1      13 12 11 10 09 08

PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY

CONTENTS

Vol. 136, No. 9

Whole No. 591

September 2008

A. ALGEBRA, NUMBER THEORY, AND COMBINATORICS

Christopher I. Byrnes and Anders Lindquist, <a href="#">A note on the Jacobian conjecture</a> .....	3007
Chi-Kwong Li and Nung-Sing Sze, <a href="#">Canonical forms, higher rank numerical ranges, totally isotropic subspaces, and matrix equations</a> .....	3013
John R. Klein and E. Bruce Williams, <a href="#">The “fundamental theorem” for the algebraic <math>K</math>-theory of spaces. III. The nil-term</a> .....	3025
Chun-Gang Ji and Yan Xue, <a href="#">An elementary proof of the law of quadratic reciprocity over function fields</a> .....	3035
Byeong Moon Kim and Poo-Sung Park, <a href="#">Hermitian lattices without a basis of minimal vectors</a> .....	3041
Wendy Lowen, <a href="#">A sheaf of Hochschild complexes on quasi-compact opens</a> .....	3045
P. Guerzhoy, <a href="#">Hecke operators for weakly holomorphic modular forms and supersingular congruences</a> .....	3051
Li-Chien Shen, <a href="#">On separation of quadratic forms on the imaginary quadratic field in its Hilbert class field</a> .....	3061
Karin Erdmann and Thorsten Holm, <a href="#">Maximal <math>n</math>-orthogonal modules for selfinjective algebras</a> .....	3069
Tomoaki Ono, <a href="#">A note on <math>p</math>-bases of a regular affine domain extension</a> .....	3079
Wladimir de Azevedo Pribitkin, <a href="#">On the sign changes of coefficients of general Dirichlet series</a> .....	3089
Pedro Berrizbeitia and Aurora Olivieri, <a href="#">A generalization of Miller’s primality theorem</a> .....	3095
B. Adamczewski and N. Rampersad, <a href="#">On patterns occurring in binary algebraic numbers</a> .....	3105

B. ANALYSIS

A. D. Ioffe, <a href="#">Critical values of set-valued maps with stratifiable graphs. Extensions of Sard and Smale-Sard theorems</a> .....	3111
Vladimir Bolotnikov, <a href="#">On a boundary analogue of the Carathéodory-Schur interpolation problem</a> .....	3121
Alexander Yu. Solynin, <a href="#">A Schwarz lemma for meromorphic functions and estimates for the hyperbolic metric</a> .....	3133
Jiecheng Chen, Dashan Fan, Meng Wang, and Xiangrong Zhu, <a href="#"><math>L^p</math> bounds for oscillatory hyper-Hilbert transform along curves</a> .....	3145
P. Găvruta, <a href="#">On a problem of Bernard Chevreau concerning the <math>\rho</math>-contractions</a> ..	3155
Robin Harte and Cora Stack, <a href="#">Separation of spectra for block triangles</a> .....	3159
L. Bernal-González, <a href="#">Dense-lineability in spaces of continuous functions</a> .....	3163
Oliver Roth, Stephan Ruscheweyh, and Luis Salinas, <a href="#">A note on generating functions for Hausdorff moment sequences</a> .....	3171
M. Laura Arias, Gustavo Corach, and M. Celeste Gonzalez, <a href="#">Generalized inverses and Douglas equations</a> .....	3177
A. Abdollahi, <a href="#">Self-commutators of automorphic composition operators on the Dirichlet space</a> .....	3185
R. Anantharaman, <a href="#">Trigonometric and Rademacher measures of nowhere finite variation</a> .....	3195

Lajos Molnár, Maps on the $n$ -dimensional subspaces of a Hilbert space preserving principal angles .....	3205
Tewodros Amdeberhan, Olivier Espinosa, and Victor H. Moll, The Laplace transform of the digamma function: An integral due to Glasser, Manna and Oloa .....	3211
Árpád Baricz, Turán type inequalities for hypergeometric functions .....	3223
Horst Behncke, The remainder in asymptotic integration .....	3231
Winston Ou, Near-symmetry in $A_\infty$ and refined Jones factorization .....	3239

#### D. GEOMETRY

Hiroshi Tamaru and Hisashi Yoshida, Lie groups locally isomorphic to generalized Heisenberg groups .....	3247
Edward M. Fan, Topology of three-manifolds with positive $P$ -scalar curvature ..	3255
J.-H. Eschenburg and M. Kerin, Almost positive curvature on the Gromoll-Meyer sphere .....	3263
Marcos M. Alexandrino and Dirk Töben, Equifocality of a singular Riemannian foliation .....	3271
Vladyslav Yaskin, On strict inclusions in hierarchies of convex bodies .....	3281
David Alonso-Gutiérrez, On the isotropy constant of random convex sets .....	3293
Bin Zhou and Xiaohua Zhu, $K$ -stability on toric manifolds .....	3301
Qing-Ming Cheng, First eigenvalue of a Jacobi operator of hypersurfaces with a constant scalar curvature .....	3309

#### E. LOGIC AND FOUNDATIONS

Longyun Ding and Bingqing Li, Products of Borel subgroups .....	3319
Sy-David Friedman, Parameter-free uniformisation .....	3327

#### G. TOPOLOGY

Feng-Yu Wang, Entropy-cost inequalities for diffusion semigroups with curvature unbounded below .....	3331
Michael Farber and Mark Grant, Robot motion planning, weights of cohomology classes, and cohomology operations .....	3339
Charles Livingston, Concordance crosscap numbers of knots and the Alexander polynomial .....	3351
John B. Etnyre, On contact surgery .....	3355
Paul Gartside, David Gauld, and Sina Greenwood, Homogeneous and inhomogeneous manifolds .....	3363

## Editorial Information

To be published in the *Proceedings*, a paper must be correct, new, nontrivial, and significant. Further, it must be well written and of interest to a substantial number of mathematicians. Piecemeal results, such as an inconclusive step toward an unproved major theorem or a minor variation on a known result, are in general not acceptable for publication. *Proceedings* Editors solicit and encourage publication of worthy papers of length not exceeding 10 published pages. Published pages are the same size as those generated in the style files provided for  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{T}\mathcal{E}\mathcal{X}$  or  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{T}\mathcal{E}\mathcal{X}$ .

Information on the backlog for this journal can be found on the AMS website starting from <http://www.ams.org/proc>.

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 out a Consent to Publish and Copyright Agreement to all authors of the paper. By submitting a paper to this journal, authors certify that the results have not been submitted to nor are they under consideration for publication by another journal, conference proceedings, or similar publication.

## Information for Authors

**Initial submission.** The AMS uses Centralized Manuscript Processing for initial submission. Authors should submit a PDF file using the Initial Manuscript Submission form found at [www.ams.org/cgi-bin/peertrack/submission.pl](http://www.ams.org/cgi-bin/peertrack/submission.pl), or send one copy of the manuscript to the following address: Centralized Manuscript Processing, PROCEEDINGS OF THE AMS, 201 Charles Street, Providence, RI 02904-2294 USA. If a paper copy is being forwarded to the AMS, indicate that it is for *Proceedings* and include the name of the corresponding author, contact information such as email address or mailing address, and the name of an appropriate Editor to review the paper (see the list of Editors below).

The first page of an article 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 at least one complete sentence, and at most 150 words. 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/](http://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/](http://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/](http://www.ams.org/mrlookup/).

**Electronically prepared manuscripts.** The AMS encourages electronically prepared manuscripts, with a strong preference for  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{T}\mathcal{E}\mathcal{X}$ . To this end, the Society has prepared  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{T}\mathcal{E}\mathcal{X}$  author packages for each AMS publication. Author packages include instructions for preparing electronic manuscripts, samples, and a style file that generates the particular design specifications of that publication series. Articles properly prepared using the  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{T}\mathcal{E}\mathcal{X}$  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  $\mathcal{T}\mathcal{E}\mathcal{X}$ , using  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{T}\mathcal{E}\mathcal{X}$  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.  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{T}\mathcal{E}\mathcal{X}$

papers also move more efficiently through the production stream, helping to minimize publishing costs.

$\mathcal{A}\mathcal{M}\mathcal{S}$ - $\text{\LaTeX}$  is the highly preferred format of  $\text{\TeX}$ , but author packages are also available in  $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\text{\TeX}$ . 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  $\text{\LaTeX}$  or plain  $\text{\TeX}$  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.  $\text{\LaTeX}$  users will find that  $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\text{\LaTeX}$  is the same as  $\text{\LaTeX}$  with additional commands to simplify the typesetting of mathematics, and users of plain  $\text{\TeX}$  should have the foundation for learning  $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\text{\LaTeX}$ .

Authors may retrieve an author package from the AMS website starting from [www.ams.org/tex/](http://www.ams.org/tex/) or via FTP to [ftp.ams.org](ftp://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/](http://www.ams.org/tex/). The author package can also be obtained free of charge by sending email to [tech-support@ams.org](mailto:tech-support@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  $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\text{\LaTeX}$  or  $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\text{\TeX}$  and the publication in which your paper will appear. Please be sure to include your complete email address.

**After acceptance.** 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 to the Editor, who will forward a copy to the Providence office. Accepted electronically prepared manuscripts can be submitted via the web at [www.ams.org/submit-book-journal/](http://www.ams.org/submit-book-journal/), sent via email to [pub-submit@ams.org](mailto:pub-submit@ams.org) (Internet), or sent on diskette to the Electronic Prepress Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. When sending a manuscript electronically via e-mail or diskette, 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 starting from [www.ams.org/jourhtml/authors.html](http://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. 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.** 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/](http://www.ams.org/mstrack/). An explanation of each production step is provided on the web through links from the manuscript tracking screen. Questions can be sent to [proc-query@ams.org](mailto:proc-query@ams.org).

**T<sub>E</sub>X files available upon request.** T<sub>E</sub>X files are available upon request for authors by sending email to [file-request@ams.org](mailto: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<sub>E</sub>X 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<sub>E</sub>X production at the AMS sometimes requires extra fonts and macros that are not yet publicly available, T<sub>E</sub>X files cannot be guaranteed to run through the author’s version of T<sub>E</sub>X without errors. The AMS regrets that it cannot provide support to eliminate such errors in the author’s T<sub>E</sub>X 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 [proc-query@ams.org](mailto:proc-query@ams.org) or directly to the Electronic Prepress Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.

## Editors

The AMS uses Centralized Manuscript Processing for initial submissions to AMS journals. Authors should follow instructions listed on the Initial Submission page found at [www.ams.org/proc/procsubmit.html](http://www.ams.org/proc/procsubmit.html).

Managing Editor: Ronald A. Fintushel, Michigan State University, East Lansing, MI 48824-1027 USA; e-mail: [ronfint@math.msu.edu](mailto:ronfint@math.msu.edu)

### 1. ODE, PDE, GLOBAL ANALYSIS, AND DYNAMICAL SYSTEMS

Coordinating Editor: Chuu-Lian Terng, University of California, Irvine, CA 92697-3875 USA; e-mail: [cterng@math.uci.edu](mailto:cterng@math.uci.edu)

**Dynamical systems and ergodic theory**, Jane M. Hawkins, CB #3250, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599 USA; e-mail: [jmh@math.unc.edu](mailto:jmh@math.unc.edu)

**Ergodic theory and dynamical systems**, Bryna Kra, Northwestern University, Mathematics Department, Evanston, IL 60208-2730; e-mail: [kra@math.northwestern.edu](mailto:kra@math.northwestern.edu)

**Global analysis, noncommutative geometry, and the mathematics of string theory**, Varghese Mathai, The University of Adelaide, School of Mathematical Sciences, SA 5005, Australia; e-mail: [mathai.varghese@adelaide.edu.au](mailto:mathai.varghese@adelaide.edu.au)

**Partial differential equations**, Matthew J. Gursky, University of Notre Dame, 255 Hurley Hall, Notre Dame, IN 46556-4618 USA; e-mail: [mgursky@nd.edu](mailto:mgursky@nd.edu)

### 2. TOPOLOGY AND GEOMETRY

Coordinating Editor: Jon G. Wolfson, Michigan State University, East Lansing, MI 48824-1027 USA; e-mail: [wolfson@math.msu.edu](mailto:wolfson@math.msu.edu)

**Algebraic topology**, Paul Goerss, Northwestern University, Evanston, IL 60208-2730 USA; e-mail: [pgoerss@math.northwestern.edu](mailto:pgoerss@math.northwestern.edu)

**Differential geometry (Riemannian geometry, complex geometry, and symplectic geometry)**, Jon G. Wolfson

**Geometric analysis (geometric PDE, minimal surfaces, and harmonic maps)**, Richard A. Wentworth, Johns Hopkins University, Baltimore, MD 21218 USA; e-mail: [wentworth@jhu.edu](mailto:wentworth@jhu.edu)

**Geometric topology**, Alexander N. Dranishnikov, University of Florida, 358 Little Hall, Gainesville, FL 32611-8105 USA; e-mail: [dranish@math.ufl.edu](mailto:dranish@math.ufl.edu)

**Low dimensional topology, gauge theory, 4-manifolds**, Daniel Ruberman, Brandeis University, Waltham, MA 02254-9110 USA; e-mail: [ruberman@brandeis.edu](mailto:ruberman@brandeis.edu)

### 3. ANALYSIS

Coordinating Editor: Andreas Seeger, University of Wisconsin, Madison, WI 53706 USA; e-mail: [seeger@math.wisc.edu](mailto:seeger@math.wisc.edu)

**Banach spaces and linear functional analysis**, Nigel J. Kalton, University of Missouri, Department of Mathematics, Columbia, MO 65211; e-mail: [nigel@math.missouri.edu](mailto:nigel@math.missouri.edu)

**Fourier analysis and dispersive PDE**, Hart F. Smith, University of Washington, Box 354350, Seattle, WA 98195-4350 USA; e-mail: [hart@math.washington.edu](mailto:hart@math.washington.edu)

**Geometric function theory**, Mario Bonk, University of Michigan, Ann Arbor, MI 48109-1043 USA; e-mail: [mbonk@umich.edu](mailto:mbonk@umich.edu)

**Geometric measure theory and its applications**, Tatiana Toro, University of Washington, Box 354350, Seattle, WA 98195-4350 USA; e-mail: [toro@math.washington.edu](mailto:toro@math.washington.edu)

**Harmonic analysis**, Michael T. Lacey, School of Mathematics, Georgia Institute of Technology, 686 Cherry Street NW, Atlanta, GA 30332-4301 USA; e-mail: [lacey@math.gatech.edu](mailto:lacey@math.gatech.edu)

**Operator algebras**, Marius Junge, University of Illinois at Urbana-Champaign, 1409 W. Green Street, Urbana, IL 61801-2975 USA; e-mail: [junge@math.uiuc.edu](mailto:junge@math.uiuc.edu)

**Several complex variables**, Mei-Chi Shaw, University of Notre Dame, Notre Dame, IN 46556-0398 USA; e-mail: [mei-chi.shaw.1@nd.edu](mailto:mei-chi.shaw.1@nd.edu)

4. ALGEBRA, NUMBER THEORY, COMBINATORICS, AND LOGIC

Coordinating Editor: Martin Lorenz, Temple University, Philadelphia, PA 19122-6094 USA; e-mail: [lorenz@temple.edu](mailto:lorenz@temple.edu)

**Algebraic geometry**, Ted Chinburg, University of Pennsylvania, Philadelphia, PA 19104-6395 USA; e-mail: [ted@math.upenn.edu](mailto:ted@math.upenn.edu)

**Automorphic forms, number theory, and applications of number theory**, Wen-Ching Winnie Li, Pennsylvania State University, University Park, PA 16802-6401 USA; e-mail: [wli@math.psu.edu](mailto:wli@math.psu.edu)

**Combinatorics**, Jim Haglund, University of Pennsylvania, 209 S. 33rd Street, Philadelphia, PA 19104-6395 USA; e-mail: [jhaglund@math.upenn.edu](mailto:jhaglund@math.upenn.edu)

**Commutative algebra**, Bernd Ulrich, Purdue University, West Lafayette, IN 47907-1395 USA; e-mail: [ulrich@math.purdue.edu](mailto:ulrich@math.purdue.edu)

**Group theory**, Jonathan I. Hall, Michigan State University, East Lansing, MI 48824-1027 USA; e-mail: [jhall@math.msu.edu](mailto:jhall@math.msu.edu)

**Lie algebras and quantized enveloping algebras**, Gail R. Letzter; e-mail: [letzter.pams@verizon.net](mailto:letzter.pams@verizon.net)

**Logic and foundations**, Julia Knight, University of Notre Dame, 255 Hurley, Notre Dame, IN 46556-4618 USA; e-mail: [knight.1@nd.edu](mailto:knight.1@nd.edu)

**Noncommutative algebra**, Birge Huisgen-Zimmermann, University of California, Santa Barbara, Santa Barbara, CA 93106-3080 USA; e-mail: [bhz.pams@math.ucsb.edu](mailto:bhz.pams@math.ucsb.edu)

**Number theory**, Ken Ono, University of Wisconsin, Madison, WI 53706 USA; e-mail: [ono@math.wisc.edu](mailto:ono@math.wisc.edu)

5. APPLIED MATHEMATICS, PROBABILITY, AND STATISTICS

Coordinating Editor: Peter A. Clarkson, Institute of Mathematics, Statistics and Actuarial Science, University of Kent, Canterbury, CT2 7NF, United Kingdom; e-mail: [P.A.Clarkson@kent.ac.uk](mailto:P.A.Clarkson@kent.ac.uk)

**Applied probability and statistics**, Edward C. Waymire, Oregon State University, Corvallis, OR 97331-4605 USA; e-mail: [waymire@math.orst.edu](mailto:waymire@math.orst.edu)

**Differential equations**, Michael I. Weinstein, Department of Applied Physics and Applied Mathematics, Columbia University, 200 S.W. Mudd MC 4701, New York, NY 10027 USA; e-mail: [miw2103@columbia.edu](mailto:miw2103@columbia.edu)

**Integrable systems and special functions**, Peter A. Clarkson

**Partial differential equations and dynamical systems**, Walter Craig, Department of Mathematics and Statistics, McMaster University, Hamilton, Ontario, L8S 4K1 Canada; e-mail: [craig@math.mcmaster.ca](mailto:craig@math.mcmaster.ca)

**Probability**, Richard C. Bradley, Indiana University, Bloomington, IN 47405-4301 USA; e-mail: [bradleyr@indiana.edu](mailto:bradleyr@indiana.edu)

(Continued from back cover)

<b>M. Laura Arias, Gustavo Corach, and M. Celeste Gonzalez</b> , Generalized inverses and Douglas equations .....	3177
<b>A. Abdollahi</b> , Self-commutators of automorphic composition operators on the Dirichlet space .....	3185
<b>R. Anantharaman</b> , Trigonometric and Rademacher measures of nowhere finite variation .....	3195
<b>Lajos Molnár</b> , Maps on the $n$ -dimensional subspaces of a Hilbert space preserving principal angles .....	3205
<b>Tewodros Amdeberhan, Olivier Espinosa, and Victor H. Moll</b> , The Laplace transform of the digamma function: An integral due to Glasser, Manna and Oloa .....	3211
<b>Árpád Baricz</b> , Turán type inequalities for hypergeometric functions .....	3223
<b>Horst Behncke</b> , The remainder in asymptotic integration .....	3231
<b>Winston Ou</b> , Near-symmetry in $A_\infty$ and refined Jones factorization .....	3239

#### D. GEOMETRY

<b>Hiroshi Tamaru and Hisashi Yoshida</b> , Lie groups locally isomorphic to generalized Heisenberg groups .....	3247
<b>Edward M. Fan</b> , Topology of three-manifolds with positive $P$ -scalar curvature ..	3255
<b>J.-H. Eschenburg and M. Kerin</b> , Almost positive curvature on the Gromoll-Meyer sphere .....	3263
<b>Marcos M. Alexandrino and Dirk Töben</b> , Equifocality of a singular Riemannian foliation .....	3271
<b>Vladyslav Yaskin</b> , On strict inclusions in hierarchies of convex bodies .....	3281
<b>David Alonso-Gutiérrez</b> , On the isotropy constant of random convex sets .....	3293
<b>Bin Zhou and Xiaohua Zhu</b> , $K$ -stability on toric manifolds .....	3301
<b>Qing-Ming Cheng</b> , First eigenvalue of a Jacobi operator of hypersurfaces with a constant scalar curvature .....	3309

#### E. LOGIC AND FOUNDATIONS

<b>Longyun Ding and Bingqing Li</b> , Products of Borel subgroups .....	3319
<b>Sy-David Friedman</b> , Parameter-free uniformisation .....	3327

#### G. TOPOLOGY

<b>Feng-Yu Wang</b> , Entropy-cost inequalities for diffusion semigroups with curvature unbounded below .....	3331
<b>Michael Farber and Mark Grant</b> , Robot motion planning, weights of cohomology classes, and cohomology operations .....	3339
<b>Charles Livingston</b> , Concordance crosscap numbers of knots and the Alexander polynomial .....	3351
<b>John B. Etnyre</b> , On contact surgery .....	3355
<b>Paul Gartside, David Gauld, and Sina Greenwood</b> , Homogeneous and inhomogeneous manifolds .....	3363

PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY

CONTENTS

Vol. 136, No. 9

Whole No. 591

September 2008

A. ALGEBRA, NUMBER THEORY, AND COMBINATORICS

Christopher I. Byrnes and Anders Lindquist, A note on the Jacobian conjecture ..... 3007

Chi-Kwong Li and Nung-Sing Sze, Canonical forms, higher rank numerical ranges, totally isotropic subspaces, and matrix equations ..... 3013

John R. Klein and E. Bruce Williams, The “fundamental theorem” for the algebraic  $K$ -theory of spaces. III. The nil-term ..... 3025

Chun-Gang Ji and Yan Xue, An elementary proof of the law of quadratic reciprocity over function fields ..... 3035

Byeong Moon Kim and Poo-Sung Park, Hermitian lattices without a basis of minimal vectors ..... 3041

Wendy Lowen, A sheaf of Hochschild complexes on quasi-compact opens ..... 3045

P. Guerzhoy, Hecke operators for weakly holomorphic modular forms and supersingular congruences ..... 3051

Li-Chien Shen, On separation of quadratic forms on the imaginary quadratic field in its Hilbert class field ..... 3061

Karin Erdmann and Thorsten Holm, Maximal  $n$ -orthogonal modules for selfinjective algebras ..... 3069

Tomoaki Ono, A note on  $p$ -bases of a regular affine domain extension ..... 3079

Wladimir de Azevedo Pribitkin, On the sign changes of coefficients of general Dirichlet series ..... 3089

Pedro Berrizbeitia and Aurora Olivieri, A generalization of Miller’s primality theorem ..... 3095

B. Adamczewski and N. Rampersad, On patterns occurring in binary algebraic numbers ..... 3105

B. ANALYSIS

A. D. Ioffe, Critical values of set-valued maps with stratifiable graphs. Extensions of Sard and Smale-Sard theorems ..... 3111

Vladimir Bolotnikov, On a boundary analogue of the Carathéodory-Schur interpolation problem ..... 3121

Alexander Yu. Solynin, A Schwarz lemma for meromorphic functions and estimates for the hyperbolic metric ..... 3133

Jiecheng Chen, Dashan Fan, Meng Wang, and Xiangrong Zhu,  $L^p$  bounds for oscillatory hyper-Hilbert transform along curves ..... 3145

P. Găvruta, On a problem of Bernard Chevreau concerning the  $\rho$ -contractions .. 3155

Robin Harte and Cora Stack, Separation of spectra for block triangles ..... 3159

L. Bernal-González, Dense-lineability in spaces of continuous functions ..... 3163

Oliver Roth, Stephan Ruscheweyh, and Luis Salinas, A note on generating functions for Hausdorff moment sequences ..... 3171

(Continued on inside back cover)



Proceedings of the American Mathematical Society  
 VOLUME 136  
 NUMBER 9  
 PAGES 3007-3374  
 SEPTEMBER 2008