
VOLUME 138 NUMBER 5



MAY 2010

WHOLE NUMBER 611

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

Kathrin Bringmann

Jianguo Cao

Peter A. Clarkson

Walter Craig

Harm Derksen

Alexander N. Dranishnikov

Franz Forstneric

Matthew J. Gursky

Jim Haglund

Jonathan I. Hall

Birge Huisgen-Zimmermann

Marius Junge

Nigel J. Kalton

Julia Knight

Bryna Kra

Michael T. Lacey

Gail R. Letzter

Varghese Mathai

Ken Ono,

Managing Editor

Matthew A. Papanikolas

Irena Peeva

Cristian D. Popescu

Richard Rochberg

Daniel Ruberman

Mei-Chi Shaw

Brooke Shipley

Hart F. Smith

Chuu-Lian Terng

Tatiana Toro

Walter Van Assche

Edward C. Waymire

Michael Wolf

Yingfei Yi

PROVIDENCE, RHODE ISLAND USA

ISSN 0002-9939

Available electronically at
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/. Subscription prices for Volume 138 (2010) are as follows: for paper delivery, US\$1161 list, US\$929 institutional member, US\$1045 corporate member, US\$697 individual member; for electronic delivery, US\$1045 list, US\$836 institutional member, US\$941 corporate member, US\$627 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\$52 for surface delivery outside the United States and India; US\$75 to India. Expedited delivery to destinations in North America is US\$89; elsewhere US\$170. Subscription renewals are subject to late fees. See www.ams.org/customers/macsfq.html#journal for more information.

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.)

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.

© 2010 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 Services*SM, *CompuMath Citation Index*[®], and *Current Contents*[®]/*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 15 14 13 12 11 10

PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY
CONTENTS

Vol. 138, No. 5

Whole No. 611

May 2010

A. ALGEBRA, NUMBER THEORY, AND COMBINATORICS

M. Ferrarotti, E. Fortuna, and L. Wilson, Algebraic approximation of germs of real analytic sets	1537
Hector Pasten, An extension of Büchi's problem for polynomial rings in zero characteristic	1549
M. Marshall, Polynomials non-negative on a strip	1559
William J. Heinzer, Louis J. Ratliff, Jr., and David E. Rush, Reductions of ideals in local rings with finite residue fields	1569
David Fisher, Nets Hawk Katz, and Irine Peng, Approximate multiplicative groups in nilpotent Lie groups	1575
Jiaqun Wei, Generalized Auslander-Reiten conjecture and tilting equivalences ..	1581
Flávio Ulhoa Coelho, Dieter Happel, and Luise Unger, Auslander generators of iterated tilted algebras	1587
Daniel Bump and Maki Nakasuji, Integration on p -adic groups and crystal bases	1595
Victor Camillo, Chan Yong Hong, Nam Kyun Kim, Yang Lee, and Pace P. Nielsen, Nilpotent ideals in polynomial and power series rings	1607

B. ANALYSIS

Stanley Chang, Positive scalar curvature of totally nonspin manifolds	1621
Horst Behncke, The remainder in asymptotic integration II	1633
Srdjan Petrovic, Spectral radius algebras and shift	1639
Olesya Bilyj, Elmar Schrohe, and Jörg Seiler, H_∞ -calculus for hypoelliptic pseudodifferential operators	1645
Lasse Rempe and Gwyneth M. Stallard, Hausdorff dimensions of escaping sets of transcendental entire functions	1657
John Wermer, A Cauchy-Riemann equation for generalized analytic functions ..	1667
John Garnett, Rowan Killip, and Raanan Schul, A doubling measure on \mathbb{R}^d can charge a rectifiable curve	1673
Benedetta Noris and Miguel Ramos, Existence and bounds of positive solutions for a nonlinear Schrödinger system	1681
Juncheng Wei and Dong Ye, On MEMS equation with fringing field	1693
Norimichi Hirano, Existence of steady stable solutions for the Ginzburg-Landau equation in a domain with nontrivial topology	1701
Julie O'Donovan, Brownian motion in a ball in the presence of spherical obstacles	1711
Calin Ambrozie, Bojan Kuzma, and Vladimir Müller, An upper bound on the dimension of the reflexivity closure	1721
Moustafa El-Shahed and H. A. Hassan, Positive solutions of q -difference equation	1733
Timur Oikhberg, Restricted Schur multipliers and their applications	1739
T. Jäger, Periodic point free homeomorphisms of the open annulus: from skew products to non-fibred maps	1751
Xing-Tang Dong and Ze-Hua Zhou, Products of Toeplitz operators on the harmonic Bergman space	1765
Athanase Papadopoulos and Guillaume Th��ret, Shortening all the simple closed geodesics on surfaces with boundary	1775

Valentino Magnani , Nonexistence of horizontal Sobolev surfaces in the Heisenberg group	1785
Pan Liu and Hairong Yuan , Uniqueness and instability of subsonic-sonic potential flow in a convergent approximate nozzle	1793

C. APPLIED MATHEMATICS

Alexandru Kristály , Location of Nash equilibria: A Riemannian geometrical approach	1803
--	------

D. GEOMETRY

Martin Chuaqui , Integral conditions on the Schwarzian for curves to be simple or unknotted	1811
Idefonso Castro and Ana M. Lerma , Hamiltonian stationary self-similar solutions for Lagrangian mean curvature flow in the complex Euclidean plane	1821
Qin Zhang , The pinching constant of minimal hypersurfaces in the unit spheres	1833
Gui-Qiang Chen, Marshall Slemrod, and Dehua Wang , Weak continuity of the Gauss-Codazzi-Ricci system for isometric embedding	1843

E. LOGIC AND FOUNDATIONS

Martin Zeman , Diamond, GCH and weak square	1853
--	------

G. TOPOLOGY

Kathryn Hess and Andrew Tonks , The loop group and the cobar construction	1861
Jung Hoon Lee , Heegaard splittings with (disk, essential surface) pairs that intersect in one point	1877
Filippo De Mari and Alessandro Ottazzi , Rigidity of Carnot groups relative to multicontact structures	1889

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 15 published pages. Published pages are the same size as those generated in the style files provided for $\mathcal{A}\mathcal{M}\mathcal{S}$ - \LaTeX or $\mathcal{A}\mathcal{M}\mathcal{S}$ - \TeX .

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/peer-review-submission, 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 2010 *Mathematics Subject Classification* representing the primary and secondary subjects of the article. The classifications are accessible from www.ams.org/msc/. 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/msnhtml/serials.pdf. To help in preparing and verifying references, the AMS offers MR Lookup, a Reference Tool for Linking, at www.ams.org/mrlookup/.

Electronically prepared manuscripts. The AMS encourages electronically prepared manuscripts, with a strong preference for $\mathcal{A}\mathcal{M}\mathcal{S}$ - \LaTeX . To this end, the Society has prepared $\mathcal{A}\mathcal{M}\mathcal{S}$ - \LaTeX 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 $\mathcal{A}\mathcal{M}\mathcal{S}$ - \LaTeX 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 $\mathcal{A}\mathcal{M}\mathcal{S}$ - \LaTeX 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. $\mathcal{A}\mathcal{M}\mathcal{S}$ - \LaTeX papers also move more efficiently through the production stream, helping to minimize publishing costs.

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

Authors may retrieve an author package for *Proceedings of the AMS* from www.ams.org/proc/procauthorpac.html or via FTP to [ftp.ams.org](ftp://ftp.ams.org) (login as `anonymous`, enter your complete email address as password, and type `cd pub/author-info`). The *AMS Author Handbook* and the *Instruction Manual* are available in PDF format from the author package link. The author package can also be obtained free of charge by sending email to 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 $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ or $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\mathcal{T}\mathcal{E}\mathcal{X}$ and the publication in which your paper will appear. Please be sure to include your complete email address.

After acceptance. The source files for 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 submit a PDF of 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/, sent via email to 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/authors/journals.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.

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/. 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.

T_EX files available upon request. T_EX files are available upon request for authors 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_EX production at the AMS sometimes requires extra fonts and macros that are not yet publicly available, T_EX files cannot be guaranteed to run through the author's version of T_EX without errors. The AMS regrets that it cannot provide support to eliminate such errors in the author's T_EX 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 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.

Managing Editor: Ken Ono, University of Wisconsin, Madison, WI 53706 USA; e-mail: ono@math.wisc.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

Ergodic theory and dynamical systems, Bryna Kra, Northwestern University, Evanston, IL 60208-2730 USA; e-mail: kra@math.northwestern.edu

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

Ordinary differential equations and dynamical systems, Yingfei Yi, School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332-0001 USA; e-mail: yi@math.gatech.edu

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

2. TOPOLOGY AND GEOMETRY

Coordinating Editor: Daniel Ruberman, Brandeis University, Waltham, MA 02254-9110 USA; e-mail: ruberman@brandeis.edu

Algebraic topology, Brooke Shipley, University of Illinois at Chicago, 851 S. Morgan Street, Chicago, IL 60607-7045 USA; e-mail: bshipley@math.uic.edu

Differential geometry, Jianguo Cao, University of Notre Dame, Notre Dame, IN 46556 USA; e-mail: Jianguo.Cao.7@nd.edu

Geometric analysis, Michael Wolf, Rice University, Mailstop 136, Houston, TX 77005-1892 USA; e-mail: mwolf@rice.edu

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

Low dimensional topology, gauge theory, 4-manifolds, Daniel Ruberman

3. ANALYSIS

Coordinating Editor: Mei-Chi Shaw, University of Notre Dame, Notre Dame, IN 46556-0398 USA; e-mail: mei-chi.shaw.1@nd.edu

Banach spaces and linear functional analysis, Nigel J. Kalton, University of Missouri, Columbia, MO 65211 USA; e-mail: kalton@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

Operator theory and spaces of holomorphic functions, Richard Rochberg, Washington University in St. Louis, One Brookings Drive, St. Louis, MO 63130 USA; e-mail: rr@math.wustl.edu

Geometric function theory, Mario Bonk, University of Michigan, Ann Arbor, MI 48109-1043 USA; e-mail: 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

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

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

Several complex variables, Franc Forstneric, University of Ljubljana, Jadranska 19, 1000 Ljubljana, Slovenia; e-mail: franc.forstneric@fmf.uni-lj.si

4. ALGEBRA, NUMBER THEORY, COMBINATORICS, AND LOGIC

Coordinating Editor: Birge Huisgen-Zimmermann, University of California, Santa Barbara, Santa Barbara, CA 93106-3080 USA; e-mail: bhz.pams@math.ucsb.edu

Algebraic and arithmetic geometry, Cristian D. Popescu, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0112 USA; e-mail: cpopescu@math.ucsd.edu

Automorphic and modular forms, Kathrin Bringmann, Mathematisches Institut der Universität zu Koeln, Weyertal 86-90, D-50931 Koeln, Germany; e-mail: kbringma@math.uni-koeln.de

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

Commutative algebra, Irena Peeva, Cornell University, Ithaca, NY 14853, USA; e-mail: irena@math.cornell.edu

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

Lie algebras and quantized enveloping algebras, Gail R. Letzter; e-mail: 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

Noncommutative algebra and invariant theory, Harm Derksen, University of Michigan, 530 Church Street, Ann Arbor, MI 48109-1043 USA; e-mail: hderksen@umich.edu

Number theory, Matthew A. Papanikolas, Texas A&M University, 3368 TAMU, College Station, TX 77843-3368 USA; e-mail: map@math.tamu.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

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

Integrable systems and special functions, Peter A. Clarkson

Partial differential equations and dynamical systems, Walter Craig, McMaster University, Hamilton, Ontario, L8S 4K1 Canada; e-mail: craig@math.mcmaster.ca

Probability, Richard C. Bradley, Indiana University, Bloomington, IN 47405-4301 USA; e-mail: bradleyr@indiana.edu

Special functions and approximation theory, Walter Van Assche, Katholieke Universiteit Leuven, Celestijnenlaan 200B, Box 2400, BE-3001 Leuven, Belgium; e-mail: walter.vanassche@wis.kuleuven.be

(Continued from back cover)

T. Jäger , Periodic point free homeomorphisms of the open annulus: from skew products to non-fibred maps	1751
Xing-Tang Dong and Ze-Hua Zhou , Products of Toeplitz operators on the harmonic Bergman space	1765
Athanase Papadopoulos and Guillaume Théret , Shortening all the simple closed geodesics on surfaces with boundary	1775
Valentino Magnani , Nonexistence of horizontal Sobolev surfaces in the Heisenberg group	1785
Pan Liu and Hairong Yuan , Uniqueness and instability of subsonic–sonic potential flow in a convergent approximate nozzle	1793

C. APPLIED MATHEMATICS

Alexandru Kristály , Location of Nash equilibria: A Riemannian geometrical approach	1803
--	------

D. GEOMETRY

Martin Chuaqui , Integral conditions on the Schwarzian for curves to be simple or unknotted	1811
Ildefonso Castro and Ana M. Lerma , Hamiltonian stationary self-similar solutions for Lagrangian mean curvature flow in the complex Euclidean plane	1821
Qin Zhang , The pinching constant of minimal hypersurfaces in the unit spheres	1833
Gui-Qiang Chen, Marshall Slemrod, and Dehua Wang , Weak continuity of the Gauss-Codazzi-Ricci system for isometric embedding	1843

E. LOGIC AND FOUNDATIONS

Martin Zeman , Diamond, GCH and weak square	1853
--	------

G. TOPOLOGY

Kathryn Hess and Andrew Tonks , The loop group and the cobar construction	1861
Jung Hoon Lee , Heegaard splittings with (disk, essential surface) pairs that intersect in one point	1877
Filippo De Mari and Alessandro Ottazzi , Rigidity of Carnot groups relative to multicontact structures	1889

PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY
 CONTENTS

Vol. 138, No. 5

Whole No. 611

May 2010

A. ALGEBRA, NUMBER THEORY, AND COMBINATORICS

M. Ferrarotti, E. Fortuna, and L. Wilson, Algebraic approximation of germs of real analytic sets 1537

Hector Pasten, An extension of Büchi’s problem for polynomial rings in zero characteristic 1549

M. Marshall, Polynomials non-negative on a strip 1559

William J. Heinzer, Louis J. Ratliff, Jr., and David E. Rush, Reductions of ideals in local rings with finite residue fields 1569

David Fisher, Nets Hawk Katz, and Irine Peng, Approximate multiplicative groups in nilpotent Lie groups 1575

Jiaqun Wei, Generalized Auslander-Reiten conjecture and tilting equivalences .. 1581

Flávio Ulhoa Coelho, Dieter Happel, and Luise Unger, Auslander generators of iterated tilted algebras 1587

Daniel Bump and Maki Nakasuji, Integration on p -adic groups and crystal bases 1595

Victor Camillo, Chan Yong Hong, Nam Kyun Kim, Yang Lee, and Pace P. Nielsen, Nilpotent ideals in polynomial and power series rings 1607

B. ANALYSIS

Stanley Chang, Positive scalar curvature of totally nonspin manifolds 1621

Horst Behncke, The remainder in asymptotic integration II 1633

Srdjan Petrovic, Spectral radius algebras and shift 1639

Olesya Bilyj, Elmar Schrohe, and Jörg Seiler, H_∞ -calculus for hypoelliptic pseudodifferential operators 1645

Lasse Rempe and Gwyneth M. Stallard, Hausdorff dimensions of escaping sets of transcendental entire functions 1657

John Wermer, A Cauchy-Riemann equation for generalized analytic functions .. 1667

John Garnett, Rowan Killip, and Raanan Schul, A doubling measure on \mathbb{R}^d can charge a rectifiable curve 1673

Benedetta Noris and Miguel Ramos, Existence and bounds of positive solutions for a nonlinear Schrödinger system 1681

Juncheng Wei and Dong Ye, On MEMS equation with fringing field 1693

Norimichi Hirano, Existence of steady stable solutions for the Ginzburg-Landau equation in a domain with nontrivial topology 1701

Julie O’Donovan, Brownian motion in a ball in the presence of spherical obstacles 1711

Calin Ambrozie, Bojan Kuzma, and Vladimir Müller, An upper bound on the dimension of the reflexivity closure 1721

Moustafa El-Shahed and H. A. Hassan, Positive solutions of q -difference equation 1733

Timur Oikhberg, Restricted Schur multipliers and their applications 1739

(Continued on inside back cover)



0002-9939(201005)138:5;1-L