A. ALGEBRA, NUMBER THEORY, AND COMBINATORICS

Pete L. Clark, Galois groups via Atkin-Lehner twists ........................................ 617
Srikanth Iyengar and Tony J. Puthenpurakal, Hilbert-Samuel functions of modules over Cohen-Macaulay rings ........................................ 637
Gongxiang Liu and Fang Li, Pointed Hopf algebras of finite corepresentation type and their classifications ................................. 649
Fuad Kittaneh, Bounds and a majorization for the real parts of the zeros of polynomials ................................................................. 659
Rodney Y. Sharp, On the Hartshorne–Speiser–Lyubeznik theorem about Artinian modules with a Frobenius action ........................................ 665
Mariagrazia Bianchi, David Chillag, Mark L. Lewis, and Emanuele Pacifici, Character degree graphs that are complete graphs .................. 671
E. Alkan, A. I. Bonciocat, N. C. Bonciocat, and A. Zaharescu, Square-free criteria for polynomials using no derivatives .................... 677
Robert M. Guralnick, Intersections of conjugacy classes and subgroups of algebraic groups ................................................................. 689
Xiangdong Xie, Growth of relatively hyperbolic groups ........................................ 695

B. ANALYSIS

Yifeng Xue, (APD)–property of $C^*$–algebras by extensions of $C^*$–algebras with (APD) ................................................................. 705
D. Han, D. Larson, Z. Pan, and W. Wogen, Separating vectors for operators ................ 713
Siqi Fu, Spectrum of the $\overline{\mathcal{J}}$–Neumann Laplacian on polydiscs ............. 725
M. Rudnev, A. V. Yurov, and V. A. Yurov, Lax pairs for higher-dimensional evolution PDEs and a 3+1 dimensional integrable generalization of the Burgers equation ........................................ 731
Y. S. Choi and Roger Lui, Linearized stability of traveling cell solutions arising from a moving boundary problem ........................................ 743
L. Bernal-González and K.-G. Grosse-Erdmann, Existence and nonexistence of hypercyclic semigroups ........................................ 755
Guang Yuan Zhang, Fixed point indices and invariant periodic sets of holomorphic systems ................................................................. 767
Richard L. Rubin, Duhamel solutions of non-homogeneous $q^2$-analogue wave equations ................................................................. 777
R. A. Zalik, On MRA Riesz wavelets ................................................................. 787
Jeffrey Brock and Dan Margalit, Weil–Petersson isometries via the pants complex ................................................................. 795
Junxiang Xu, Persistence of Floquet invariant tori for a class of non-conservative dynamical systems ........................................ 805
Ethan M. Coven, Marcus Pivato, and Reem Yassawi, Prevalence of odometers in cellular automata ........................................ 815
Teodor Străvan Bildea, The Laplacian subalgebra of $\mathcal{L}(F_N)^{\otimes k}$ is a strongly singular masa ........................................ 823
Antonio Avilés, The unit ball of the Hilbert space in its weak topology ............ 833
<table>
<thead>
<tr>
<th>C. APPLIED MATHEMATICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>André Nies, <strong>Non-cupping and randomness</strong> ........................................ 837</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D. GEOMETRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jens Heber, Gerhard Knieper, and Hemangi M. Shah, <strong>Asymptotically harmonic spaces in dimension 3</strong> ......................................... 845</td>
</tr>
<tr>
<td>M. Yaskina, <strong>Non-intersection bodies, all of whose central sections are intersection bodies</strong> .................................................. 851</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E. LOGIC AND FOUNDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liang Yu, <strong>When van Lambalgen’s Theorem fails</strong> .................................. 861</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F. STATISTICS AND PROBABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chunsheng Ma, <strong>Why is isotropy so prevalent in spatial statistics?</strong> .......... 865</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G. TOPOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bertrand Deroin, <strong>Nonrigidity of hyperbolic surfaces laminations</strong> .............. 873</td>
</tr>
<tr>
<td>Tyler Lawson, <strong>Realizability of the Adams-Novikov spectral sequence for formal A-modules</strong> .................................................. 883</td>
</tr>
<tr>
<td>Gregory C. Verchota, <strong>Harmonic homeomorphisms of the closed disc to itself need to be in W^{1,p}, p &lt; 2, but not W^{1,2}</strong> .................................................. 891</td>
</tr>
<tr>
<td>Ming Liao and Longmin Wang, <strong>Average under the Iwasawa transformation</strong> .... 895</td>
</tr>
<tr>
<td>Ximin Liu and Nobuhiro Nakamura, <strong>Pseudofree Z/3-actions on K3 surfaces</strong> .... 903</td>
</tr>
<tr>
<td>Stephen Devlin and Jason Schultz, <strong>Waldspurger’s involution and lifting of characters</strong> ............................................................... 911</td>
</tr>
<tr>
<td>Duong Minh Duc, Tran Vinh Hung, and Nguyen Tien Khai, <strong>Morse–Palais lemma for nonsmooth functionals on normed spaces</strong> ..................... 921</td>
</tr>
</tbody>
</table>
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 \texttt{AMSL\TeX} or \texttt{AMST\TeX}.

Information on the backlog for this journal can be found on the AMS website starting from \url{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 \url{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 \url{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 \url{www.ams.org/publications/}. To help in preparing and verifying references, the AMS offers MR Lookup, a Reference Tool for Linking, at \url{www.ams.org/mrlookup/}.

Electronically prepared manuscripts. The AMS encourages electronically prepared manuscripts, with a strong preference for \texttt{AMSL\TeX}. To this end, the Society has prepared \texttt{AMSL\TeX} 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 \texttt{AMSL\TeX} style file and the \texttt{\label} and \texttt{\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 \texttt{AMSL\TeX} 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. \texttt{AMSL\TeX}
papers also move more efficiently through the production stream, helping to minimize publishing costs.

AMS-\LaTeX{} is the highly preferred format of \TeX{}, but author packages are also available in AMS-\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 AMS-\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 AMS-\LaTeX{}.

Authors may retrieve an author package from the AMS website starting from \url{www.ams.org/tex/} or via FTP to \url{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 \url{www.ams.org/tex/}. 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 AMS-\LaTeX{} or AMS-\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 \url{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 \url{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 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/](http://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 proc-query@ams.org.

\TeX files available upon request. \TeX 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 \TeX 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 \TeX production at the AMS sometimes requires extra fonts and macros that are not yet publicly available, \TeX 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 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: Ronald A. Fintushel, Michigan State University, East Lansing, MI 48824-1027 USA; e-mail: 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
   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
   Global analysis, Mikhail Shubin, Northeastern University, Boston, MA 02115 USA; e-mail: shubin@neu.edu
   Ordinary differential equations and special functions, Carmen C. Chicone, University of Missouri, Columbia, MO 65211-0001 USA; e-mail: carmen@chicone.math.missouri.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: Jon G. Wolfson, Michigan State University, East Lansing, MI 48824-1027 USA; e-mail: wolfson@math.msu.edu
   Algebraic topology, Paul Goerss, Northwestern University, Evanston, IL 60208-2730 USA; e-mail: 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
   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, Brandeis University, Waltham, MA 02254-9110 USA; e-mail: ruberman@brandeis.edu

3. ANALYSIS
   Coordinating Editor: Andreas Seeger, University of Wisconsin, Madison, WI 53706 USA; e-mail: seeger@math.wisc.edu
   Banach spaces and linear functional analysis, N. Tomczak-Jaegermann, University of Alberta, Edmonton, AB, Canada T6G 2G1; e-mail: ntomczak@math.ualberta.ca
   Fourier analysis and dispersive PDE, Hart F. Smith, University of Washington, Box 354350, Seattle, WA 98195-4350 USA; e-mail: hart@math.washington.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
   One complex variable and potential theory, Juha M. Heinonen, University of Michigan, Ann Arbor, MI 48109-1109 USA; e-mail: PAMS1@umich.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, Mei-Chi Shaw, University of Notre Dame, Notre Dame, IN 46556-0398 USA; e-mail: 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

Algebraic geometry, Ted Chinburg, University of Pennsylvania, Philadelphia, PA 19104-6395 USA; e-mail: 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

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

Commutative algebra, Bernd Ulrich, Purdue University, West Lafayette, IN 47907-1395 USA; e-mail: ulrich@math.purdue.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, Birge Huisgen-Zimmerman, University of California, Santa Barbara, Santa Barbara, CA 93106-3080 USA; e-mail: bhz.pams@math.ucsb.edu

Number theory, Ken Ono, University of Wisconsin, Madison, WI 53706 USA; e-mail: 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

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

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

Probability, Richard C. Bradley, Indiana University, Bloomington, IN 47405-4301 USA; e-mail: bradleyr@indiana.edu
Ethan M. Coven, Marcus Pivato, and Reem Yassawi, Prevalence of
odometers in cellular automata .................................................. 815
Teodor Ştefan Bîdeanu, The Laplacian subalgebra of $L(F_N)\otimes_k$ is a strongly singular
masa ......................................................................................... 823
Antonio Avilés, The unit ball of the Hilbert space in its weak topology .... 833

C. APPLIED MATHEMATICS

André Nies, Non-cupping and randomness .......................................... 837

D. GEOMETRY

Jens Heber, Gerhard Knieper, and Hemangi M. Shah, Asymptotically
harmonic spaces in dimension 3 .................................................... 845
M. Yaskina, Non-intersection bodies, all of whose central sections are intersection
bodies .......................................................................................... 851

E. LOGIC AND FOUNDATIONS

Liang Yu, When van Lambalgen’s Theorem fails .................................. 861

F. STATISTICS AND PROBABILITY

Chunsheng Ma, Why is isotropy so prevalent in spatial statistics? ........... 865

G. TOPOLOGY

Bertrand Deroin, Nonrigidity of hyperbolic surfaces laminations ............. 873
Tyler Lawson, Realizability of the Adams-Novikov spectral sequence for formal
$A$-modules .................................................................................. 883
Gregory C. Verchota, Harmonic homeomorphisms of the closed disc to itself need
be in $W^{1,p}$, $p < 2$, but not $W^{1,2}$ ................................................. 891
Ming Liao and Longmin Wang, Average under the Iwasawa transformation .. 895
Ximin Liu and Nobuhiro Nakamura, Pseudofree $\mathbb{Z}/3$-actions on $K3$ surfaces 903
Stephen Devlin and Jason Schultz, Waldspurger’s involution and lifting of
characters ...................................................................................... 911
Duong Minh Duc, Tran Vinh Hung, and Nguyen Tien Khai, Morse–Palais
lemma for nonsmooth functionals on normed spaces .............................. 921
PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY
CONTENTS
Vol. 135, No. 3 Whole No. 573 March 2007

A. ALGEBRA, NUMBER THEORY, AND COMBINATORICS

Pete L. Clark, Galois groups via Atkin-Lehner twists .......................... 617
Srikanth Iyengar and Tony J. Puthenpurakal, Hilbert–Samuel functions of modules over Cohen-Macaulay rings .................................. 637
Gongxiang Liu and Fang Li, Pointed Hopf algebras of finite corepresentation type and their classifications ........................................ 649
Fuad Kittaneh, Bounds and a majorization for the real parts of the zeros of polynomials .......................................................... 659
Rodney Y. Sharp, On the Hartshorne–Speiser–Lyubeznik theorem about Artinian modules with a Frobenius action ............................... 665
Mariagrazia Bianchi, David Chillag, Mark L. Lewis, and Emanuele Pacifici, Character degree graphs that are complete graphs .............. 671
E. Alkan, A. I. Bonciocat, N. C. Bonciocat, and A. Zaharescu, Square-free criteria for polynomials using no derivatives .......................... 677
Robert M. Guralnick, Intersections of conjugacy classes and subgroups of algebraic groups ......................................................... 689
Xiangdong Xie, Growth of relatively hyperbolic groups .......................... 695

B. ANALYSIS

Yifeng Xue, (APD)–property of $C^*$–algebras by extensions of $C^*$–algebras with (APD) ............................................................ 705
D. Han, D. Larson, Z. Pan, and W. Wogen, Separating vectors for operators .......................................................... 713
Siqi Fu, Spectrum of the $\overline{\partial}$–Neumann Laplacian on polydiscs ........................................................................ 725
M. Rudnev, A. V. Yurov, and V. A. Yurov, Lax pairs for higher-dimensional evolution PDEs and a 3+1 dimensional integrable generalization of the Burgers equation ............................................. 731
Y. S. Choi and Roger Lui, Linearized stability of traveling cell solutions arising from a moving boundary problem .................................. 743
L. Bernal-González and K.-G. Grosse-Erdmann, Existence and nonexistence of hypercyclic semigroups ............................................. 755
Guang Yuan Zhang, Fixed point indices and invariant periodic sets of holomorphic systems .......................................................... 767
Richard L. Rubin, Duhamel solutions of non-homogeneous $q^2$-analogue wave equations .......................................................... 777
R. A. Zalik, On MRA Riesz wavelets .................................................... 787
Jeffrey Brock and Dan Margalit, Weil–Petersson isometries via the pants complex .......................................................... 795
Junxiang Xu, Persistence of Floquet invariant tori for a class of non-conservative dynamical systems ............................................. 805

(Continued on inside back cover)