
VOLUME 347 NUMBER 7



JULY 1995

WHOLE NUMBER 722

TRANSACTIONS

OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITED BY

Robert Bryant
Daniel M. Burns
Gregory L. Cherlin
Richard Durrett
Lawrence Ein
Philip J. Hanlon
Wen-Ching Winnie Li
Mark Mahowald
John Mallet-Paret
Jill C. Pipher
Daniel J. Rudolph
Peter Shalen, Managing Editor
Robert J. Stanton
Efim Zelmanov

PROVIDENCE, RHODE ISLAND USA

ISSN 0002-9947

Transactions of the American Mathematical Society

This journal is devoted entirely to research in pure and applied mathematics.

Subscription information. *Transactions of the American Mathematical Society* is published monthly. Subscription prices for Volumes 347 (1995) are \$980 list; \$784 institutional member. A late charge of 10% of the subscription price will be imposed upon orders received from nonmembers after January 1 of the subscription year. Subscribers outside the United States and India must pay a postage surcharge of \$27; subscribers in India must pay a postage surcharge of \$50. Expedited delivery to destinations in North America \$38; elsewhere \$127.

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

Subscriptions and orders should be addressed to the American Mathematical Society, P. O. Box 5904, Boston, MA 02206-5904. *All orders must be accompanied by payment.* Other correspondence should be addressed to P. O. Box 6248, Providence, RI 02940-6248.

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 Assistant Director of Production, American Mathematical Society, P. O. Box 6248, Providence, Rhode Island 02940-6248. Requests can also be made by e-mail to reprint-permission@math.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.)

Transactions of the American Mathematical Society is published monthly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2213. Second-class postage is paid at Providence, Rhode Island. Postmaster: Send address changes to Transactions, American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248.

©Copyright 1995 by the American Mathematical Society. All rights reserved.

Printed in the United States of America.

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

⊗ Printed on recycled paper.

This publication was typeset using *AMS-TEX*,
the American Mathematical Society's *TeX* macro system.

10 9 8 7 6 5 4 3 2 1 00 99 98 97 96 95

NOTICE TO READERS

This issue of the *Transactions* contains a number of papers that were originally communicated to the *Proceedings of the American Mathematical Society*. The transfer of papers from the *Proceedings* to the *Transactions* is a temporary measure intended primarily to alleviate the backlog of the *Proceedings*. Each of the transferred papers includes a footnote indicating that it was originally communicated to the *Proceedings* and giving the name of the communicating editor.

Peter Shalen, Managing Editor, *Transactions of the AMS*
Irwin Kra, Managing Editor, *Proceedings of the AMS*

Editorial Information

To be published in the *Transactions*, 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. *Transactions* Editors shall solicit and encourage publication of worthy papers of length exceeding 10 published pages. Published pages are the same size as those generated in the style files provided for *AMS-TeX* or *AMS-LATeX*.

As of March 31, 1995, the backlog for this journal was approximately 4 issues. This estimate is the result of dividing the number of manuscripts for this journal in the Providence office that have not yet gone to the printer on the above date by the average number of articles per issue over the previous twelve months, reduced by the number of issues published in four months (the time necessary for editing and composing a typical issue).

A Copyright Transfer Agreement is required before a paper will be published in this journal. By submitting a paper to this journal, authors certify that the manuscript has not been submitted to nor is it under consideration for publication by another journal, conference proceedings, or similar publication.

Information for Authors and Editors

The first page must consist of a *descriptive title*, followed by an *abstract* that summarizes the article in language suitable for workers in the general field (algebra, analysis, etc.). The *descriptive title* should be short, but informative; useless or vague phrases such as "some remarks about" or "concerning" should be avoided. The *abstract* should be at least one complete sentence, and at most 300 words. Included with the footnotes to the paper, there should be the 1991 *Mathematics Subject Classification* representing the primary and secondary subjects of the article. This may be followed by a list of *key words and phrases* describing the subject matter of the article and taken from it. A list of the numbers may be found in the annual index of *Mathematical Reviews*, published with the December issue starting in 1990, as well as from the electronic service e-MATH [[telnet e-MATH.ams.org](telnet://e-MATH.ams.org) (or [telnet 130.44.1.100](telnet://130.44.1.100))]. Login and password are **e-math**. For journal abbreviations used in bibliographies, see the list of serials in the latest *Mathematical Reviews* annual index. When the manuscript is submitted, authors should supply the editor with electronic addresses if available. These will be printed after the postal address at the end of each article.

Two copies of the paper should be sent directly to the appropriate Editor and the author should keep one copy.

T_EX files available upon request. Authors may request a copy of the T_EX files of their papers by sending e-mail to file-request@math.ams.org or by contacting the Editorial Department, American Mathematical Society, P.O. Box 6248, Providence, RI 02940-6248. 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 e-mail, please include the e-mail 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.

Electronically Prepared Manuscripts. The AMS encourages submission of electronically prepared manuscripts in $\text{\textit{AMS-}\TeX}$ or $\text{\textit{AMS-}\LaTeX}$ because properly prepared electronic manuscripts save the author proofreading time and move more quickly through the production process. To this end, the Society has prepared author packages for each AMS publication. Author packages include instructions for preparing electronic manuscripts, the *AMS Author Handbook*, samples, and a style file that generates the particular design specifications of that publication series for both $\text{\textit{AMS-}\TeX}$ and $\text{\textit{AMS-}\LaTeX}$.

Those authors who make use of these style files from the beginning of the writing process will further reduce their own efforts. Electronically submitted manuscripts prepared in plain \TeX or \LaTeX 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. Users of plain \TeX should have little difficulty learning $\text{\textit{AMS-}\TeX}$, and \LaTeX users will find that $\text{\textit{AMS-}\LaTeX}$ is the same as \LaTeX with additional commands to simplify the typesetting of mathematics.

Authors with FTP access may retrieve an author package from the Society's Internet node `e-MATH.ams.org` (130.44.1.100). For those without FTP access, the author package can be obtained free of charge by sending e-mail to `pub@math.ams.org` (Internet) or from the Publication Division, American Mathematical Society, P.O. Box 6248, Providence, RI 02940-6248. When requesting an author package, please specify $\text{\textit{AMS-}\TeX}$ or $\text{\textit{AMS-}\LaTeX}$ and the publication in which your paper will appear.

At the time of submission, authors should indicate if the paper has been prepared using $\text{\textit{AMS-}\TeX}$ or $\text{\textit{AMS-}\LaTeX}$ and provide the Editor with a paper manuscript that matches the electronic manuscript. The final version of the electronic manuscript should be sent to the Providence office immediately after the paper has been accepted for publication. The author should also send the final version of the paper manuscript to the Editor, who will forward a copy to the Providence office. Editors will require authors to send their electronically prepared manuscripts to the Providence office in a timely fashion. Electronically prepared manuscripts can be sent via e-mail to `pub-submit@math.ams.org` (Internet) or on diskette to the Editorial Department, American Mathematical Society, P.O. Box 6248, Providence, RI 02940-6248. When submitting an electronic manuscript, 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 submit files are included in the author package.

Any inquiries concerning a paper that has been accepted for publication should be sent directly to the Editorial Department, American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248.

Editors

Two copies of papers intended for publication in *Transactions* or *Memoirs* should be addressed to the appropriate editor. Subjects, and the editors associated with them, follow.

Harmonic analysis, representation theory, and Lie theory to ROBERT J. STANTON, Department of Mathematics, Ohio State University, 231 West 18th Avenue, Columbus, OH 43210-1174; e-mail: stanton@function.mps.ohio-state.edu

Ergodic theory, dynamical systems, abstract analysis to DANIEL J. RUDOLPH, Department of Mathematics, University of Maryland, College Park, MD 20742; e-mail: djr@math.umd.edu

Algebra to EFIM ZELMANOV, Department of Mathematics, Yale University, 10 Hillhouse Avenue, New Haven, CT 06520

Geometric topology, hyperbolic geometry, infinite group theory, and general topology to PETER SHALEN, Department of Mathematics, Statistics and Computer Science, University of Illinois at Chicago, Chicago, IL 60607-4348; e-mail: shalen@math.uic.edu

Algebraic topology and differential topology to MARK MAHOWALD, Department of Mathematics, Northwestern University, 2033 Sheridan Road, Evanston, IL 60288-2730; e-mail: mark@math.nwu.edu

Ordinary differential equations, partial differential equations, and applied mathematics to JOHN MALLET-PARET, Division of Applied Mathematics, Brown University, Providence, RI 02912-9000; e-mail: am438000@brownvm.brown.edu

Global analysis and differential geometry to ROBERT L. BRYANT, Department of Mathematics, Duke University, Durham, NC 27706-7706; e-mail: bryant@math.duke.edu

Probability and statistics to RICHARD DURRETT, Department of Mathematics, Cornell University, Ithaca, NY 14853-7901; e-mail: rtd@cornell.a.cit.cornell.edu

Combinatorics and Lie theory to PHILIP J. HANLON, Department of Mathematics, University of Michigan, Ann Arbor, MI 48109-1003; e-mail: phil.hanlon@math.lsa.umich.edu

Logic and universal algebra to GREGORY L. CHERLIN, Department of Mathematics, Hill Center, Busch Campus, New Brunswick, NJ 08903; e-mail: cherlin@math.rutgers.edu

Algebraic number theory, analytic number theory, and automorphic forms to WEN-CHING WINNIE LI, Department of Mathematics, Pennsylvania State University, University Park, PA 16802-6401

Complex analysis and complex geometry to DANIEL M. BURNS, Department of Mathematics, University of Michigan, Ann Arbor, MI 48109-1003; e-mail: burns@gauss.stanford.edu

Algebraic geometry and commutative algebra to LAWRENCE EIN, Department of Mathematics, University of Illinois, 851 S. Morgan (M/C 249), Chicago, IL 60607-7045; e-mail: U22425@uicvm.uic.edu

Real and harmonic analysis and elliptic partial differential equations to JILL C. PIPHER, Department of Mathematics, Brown University, Providence, RI 02910-9000; e-mail: jipipher@gauss.math.brown.edu

All other communications to the editors should be addressed to the Managing Editor, PETER SHALEN, Department of Mathematics, Statistics and Computer Science, University of Illinois at Chicago, Chicago, IL 60607-4348; e-mail: shalen@math.uic.edu.

MEMOIRS OF THE AMERICAN MATHEMATICAL SOCIETY

This bimonthly journal is devoted to research in pure and applied mathematics of much the same nature as appears in *Transactions*. An issue consists of one or more separately bound research tracts for which the author(s) has provided reproduction copy. Prior to 1975 this was published as a monograph series. The editorial committee is identical with that for the *Transactions* so that papers intended for publication in this series should be addressed to one of the editors.

TRANSACTIONS OF THE AMERICAN MATHEMATICAL SOCIETY

CONTENTS

Vol. 347, No. 7

Whole No. 722

July 1995

Donald A. Dawson, Andreas Greven, and Jean Vaillancourt, Equilibria and quasi-equilibria for infinite collections of interacting Fleming-Viot processes	2277
Everett W. Howe, Principally polarized ordinary abelian varieties over finite fields	2361
Zhengyuan Guan and Athanassios G. Kartasatos, Ranges of perturbed maximal monotone and m -accretive operators in Banach spaces	2403
Marcos Dajczer and Enaldo Vergasta, Conformal hypersurfaces with the same Gauss map	2437
Vittorino Pata, Lévy type characterization of stable laws for free random variables	2457
Amine Hadjar, Sur les structures de contact régulières en dimension trois	2473
Dian K. Palagachev, Quasilinear elliptic equations with VMO coefficients	2481
Nikolaos S. Papageorgiou, On the conditional expectation and convergence properties of random sets	2495
Kuniaki Horie and Hiroko Ogura, On the ideal class groups of imaginary abelian fields with small conductor	2517
Jennifer Schultens, Heegaard splittings of Seifert fibered spaces with boundary	2533
J.-P. Gossez and P. Omari, On a semilinear elliptic Neumann problem with asymmetric nonlinearities	2553
Karl-Goswin Grosse-Erdmann and Karin Stadtmüller, Characterization of summability points of Nörlund methods	2563
G. Crombez, Viewing parallel projection methods as sequential ones in convex feasibility problems	2575
Rong-Qing Jia, The Toeplitz theorem and its applications to approximation theory and linear PDE's	2585
Eberhard Kaniuth and Annette Markfort, On C^* -algebras associated to the conjugation representation of a locally compact group	2595
Bernard Beauzamy and Jérôme Dégot, Differential identities	2607
Boško Živaljević, Π_1^1 functions are almost internal	2621
Y. S. Choi, A. C. Lazer, and P. J. McKenna, On a singular quasilinear anisotropic elliptic boundary value problem	2633
Thomas Dowling and Anthony G. O'Farrell, Affine transformations and analytic capacities	2643
D. S. Passman and Declan Quinn, Involutory Hopf algebras	2657
Alan R. Elcrat and Kenneth G. Miller, Variational formulas on Lipschitz domains	2669
Kevin Madigan and Alec Matheson, Compact composition operators on the Bloch space	2679



0002-9947(199507)347:7;1-K