Proceedings of the American Mathematical Society

This journal is devoted entirely to research in pure and applied mathematics. The following statement was adopted by order of the Council of the American Mathematical Society on January 22, 1975.

Statement of Editorial Policy

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 shall solicit, and encourage publication of, worthy papers of length not exceeding 11 typed pages.

Blind Refereeing: Author's Responsibility

In January, 1975, the Council of the Society selected the Proceedings for a two-year experiment with "blind refereeing". Policy now in effect is that an author submitting a paper to the Proceedings shall send two manuscripts: one containing all pertinent personal data and the other not containing the author's name or institutional affiliation. This second copy will be refereed, and the Editor shall not reveal the name or institution of the author to the referee. It is not the responsibility of the Editor to suppress evidence internal to the paper, including the bibliography, from which the referee might determine the author's identity.

Authors are cautioned that the Editor may not initiate the refereeing process until two copies of the manuscript have been received from the author.

PUBLICATION CHARGES: The research journals of the American Mathematical Society carry a page charge of $40.00 per page to help defray the cost of publication. This amount is charged to the institution or to a contract supporting the research reported in the published paper. The publication charge policy of the United States Federal Council for Science and Technology (FCST) is reported on page 112 of the February, 1975 issue of the Notices of the American Mathematical Society. In no case is the author personally responsible for paying the page charge, nor is acceptance of the author's paper for publication dependent upon payment of the page charge.

SUBSCRIPTION INFORMATION: Subscription prices for Volumes 62–67 (1977) are list $132.00, member $66.00. Back number prices per volume for Volumes 1–53 (1950–1975) are list $30.00, member $22.50; for Volumes 54–61 (1976), list $34.00, member $25.50.

BACKLOG: None. Papers currently being received by the editors will be published in 9–11 months.

MICROFILM EDITIONS: Back volumes of PROCEEDINGS are also available on 16 mm microfilm, either negative or positive, and may be mounted on spools or in Eastman or 3M cartridges. Volumes 1–53 (1950–1975) are mounted on 11 spools and cost $330.00 for spools or $366.00 for cartridges. Only current subscribers are eligible to purchase back volumes on microfilm.

THE PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY is published monthly. Subscriptions and orders for publications of the American Mathematical Society should be addressed to the American Mathematical Society, P. O. Box 1571, Annex Station, Providence, R. I. 02901. All orders must be accompanied by payment. Other correspondence should be addressed to P. O. Box 6248, Providence, R. I. 02940.

Second class postage paid at Providence, Rhode Island, and additional mailing offices.

U. S. Postal Service Publication No. 445600.

Copyright © American Mathematical Society 1977

Printed in the United States of America
Preparation and Submission of Manuscript

1. Articles for insertion should be typewritten, double spaced, and no more than 11 pages (8\(\frac{1}{2}\)" x 11") long. Ditto is not generally satisfactory, although other modes of multiple reproduction may be. The Manual for Authors, available from the Society, should be consulted for symbols and style conventions. Authors should take the greatest possible care in preparing the original manuscript. Hand drawn symbols are satisfactory, if clearly done; directions to the printer should be included where necessary on a separate sheet. Authors must keep a complete copy of their manuscript, and editors will acknowledge receipt.

2. The first page should consist of a descriptive title, followed by an abstract which 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, but placed before the first footnote, there should be first the AMS (MOS) subject classification numbers 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. The AMS (MOS) Subject Classification Scheme (1970) with instructions for its use can be found as an appendix to Mathematical Reviews, Index to Volume 39 (June 1970). See the June 1970 Notices for more details, as well as illustrative examples.

3. Very short notes not to exceed 1 printed page are also accepted, and appear under the heading SHORTER NOTES. Items deemed suitable include an elegant new proof of an important and well-known theorem, an illuminating example or counterexample, or a new viewpoint on familiar results. New results, if of a brief and striking character, might also be acceptable, though in general a paper which is merely very short will not be suitable for the SHORTER NOTES department.

Reprints and Address Changes

Any inquiries concerning a paper which has been accepted for publication, including information regarding reprints or changes of address for mailing proof, should be sent directly to the Editorial Department, American Mathematical Society, P.O. Box 6248, Providence, Rhode Island 02940.

Galley Proof

When a paper with more than one author has been accepted for publication, only one set of galley proof will be sent. Joint authors should, therefore, indicate which of them should receive galley proof in the event that the manuscript is accepted for publication.
 Submission of Manuscript

Send papers directly to one of the editors listed under the subject field of the paper. The numbers in parentheses are the first two digits of major classifications from the AMS (MOS) Subject Classification Scheme (1970) and describe the fields being handled by the editor.

**LOGIC AND FOUNDATIONS (02 04)**
- Paul C. Eklof, Department of Mathematics, University of California, Irvine, California 92717

**COMBINATORICS AND DISCRETE MATHEMATICS (05 15)**
- Thomas H. Brylawski, Department of Mathematics, University of North Carolina, Chapel Hill, North Carolina 27514

**COMMUTATIVE ALGEBRA (06 12 13 14 15 18)**
- Robert M. Fossum, Department of Mathematics, University of Illinois, Urbana, Illinois 61801

**GENERAL ALGEBRA (16 17 18 08)**
- Barbara L. Osofsky, Department of Mathematics, Rutgers University, New Brunswick, New Jersey 08903

**GROUP THEORY (20)**
- Norman Blackburn, Department of Mathematics, The University, Manchester M13 9PL, England

**ALGEBRAIC AND DIFFERENTIAL TOPOLOGY (55 57 58)**
- Reinhard E. Schultz, Department of Mathematics, Purdue University, West Lafayette, Indiana 47907

**REAL VARIABLES (26 28 40)**
- Richard A. Hunt, Department of Mathematics, Purdue University, West Lafayette, Indiana 47907

**COMPLEX VARIABLES AND ANALYTIC NUMBER THEORY (10 30 32)**
- W. E. Kirwan, Department of Mathematics, University of Maryland, College Park, Maryland 20742
- Lawrence A. Zalcman, Department of Mathematics, University of Maryland, College Park, Maryland 20742

**DIFFERENTIAL EQUATIONS (33 34 35 39 49)**
- Richard K. Miller, Department of Mathematics, Iowa State University, Ames, Iowa 50010

**GENERAL ANALYSIS (41 42 43 44 45)**
- Richard R. Goldberg, Department of Mathematics, Vanderbilt University, Nashville, Tennessee 37235

**FUNCTIONAL ANALYSIS AND OPERATOR THEORY (46 47)**
- Chandler Davis, Department of Mathematics, University of California at Berkeley, Berkeley, California 94720
- Ronald G. Douglas, Department of Mathematics, State University of New York at Stony Brook, Stony Brook, New York 11790
- Robert R. Phelps, Department of Mathematics, University College London, Gower Street, London WC1E 6BT, England

**GEOMETRY (22 50 52 53)**
- Joseph A. Wolf, Department of Mathematics, University of California at Berkeley, Berkeley, California 94720

**GENERAL TOPOLOGY (54)**
- David J. Lutzer, Department of Mathematics, Texas Tech University, Lubbock, Texas 79409
- Thomas A. Chapman, Department of Mathematics, University of Kentucky, Lexington, Kentucky 40506

**PROBABILITY AND OTHER FIELDS (31 60–99 inclusive)**
- Naresh Jain, School of Mathematics, 127 Vincent Hall, University of Minnesota, Minneapolis, Minnesota 55455

All other communications should be addressed to the Managing Editor, Barbara L. Osofsky, at the above address. See the back inside cover of the Bulletin of the American Mathematical Society for those Editors eligible to submit research announcements to the Bulletin.
F. STATISTICS AND PROBABILITY
Sums of independent random variables and the Burkholder transforms. By J.-P. GABRIEL .......................................................... 123

G. TOPOLOGY
On the existence of $\omega$-points. By ANDRZEJ SZYMAŃSKI ......................................................... 128
Aspherical generators of unoriented cobordism. By DAVID C. ROYSTER .................. 131
On the cardinality of a topological space. By ARTHUR CHARLESWORTH ........... 138
On the orbit types in a circle action. By ELLIOTT STEIN .................................................. 143
The Lefschetz fixed point theorem for compact groups. By RONALD J. KNILL .......... 148
Independence theories and generalized zero-one laws. By LAWRENCE NEFF STOUT ... 153
Open and uniformly open relations. By P. MAH and S. A. NAIMPALLY ................. 159
The class of compact* spaces is productive and closed hereditary. By W. GOVAERTS..... 167
The index of a holomorphic mapping and the index theorem. By TÔRU ISHIHARA ....... 169
Canonical objects in Kirillov theory on nilpotent Lie groups. By RICHARD C. PENNEY ......................................................... 175

SHORTER NOTES
Distinct sums over subsets. By F. HANSON, J. M. STEELE and F. STENGER ........ 179
Sticky arcs in $E^n (n > 4)$. By DAVID G. WRIGHT .................................................. 181
The range of a vector measure has the Banach-Saks property. By R. ANANTHARAMAN ....................................................... 183
The numerical range and the essential numerical range. By J. P. WILLIAMS ........ 185
A nonspectral Birkhoff-regular differential operator. By PHILIP W. WALKER ........ 187
CONTENTS

Vol. 66, No. 1 SEPTEMBER 1977 Whole No. 219

A. ALGEBRA AND NUMBER THEORY

Schur multipliers of some finite nilpotent groups. By DAVID A. JACKSON .......... 1
When is the free product of lattices complete? By GEORGE GRATZER and DAVID KELLY ........................................... 6
On τ'-closure of τ-homogeneous groups. By PANELA FERGUSON ..................... 9
On a theorem of Posner. By MANSOOR AHMAD ................................... 13
A metrizable cancellative semigroup without translation invariant metric. By PRZE-MYSŁAW and MAI-GUO ................................. 17

B. ANALYSIS

Some explicitly invertible Toeplitz operators on the quarter-plane. By JAMES RADLOW ............................................................... 20
Extension of invariant linear functionals. By KY FAN ................................ 23
Dilations on involution semigroups. By F. H. SZAFRANIEC ............................. 30
A class of one-parameter nonlinear semigroups with differentiable approximating semigroups. By G. EDGAR PARKER .......................... 33
A necessary and sufficient condition that a function on the maximal ideal space of a Banach algebra be a multiplier. By JAMES A. WOOD ......................... 38
A unique continuation theorem involving a degenerate parabolic operator. By ALAN V. LAIR ................................................................ 41
Cluster sets on open Riemann surfaces. By MIKIO NIIMURA .......................... 46
Some counterexamples concerning intrinsic distances. By THEODORE J. BARTH ..... 49
A new proof of Caristi's fixed point theorem. By JERROLD SIEGEL .................. 54
Ideal boundaries of a Riemann surface for the equation Δu = Pu. By J. L. SCHIFF .... 57
Conditions for generating a nonvanishing bounded analytic function. By J. H. MANTEL .. 62
On the twenty-ninth question of Allen Shields. By JOSEPH G. STAMPFLI .......... 65
Fixed point theorems for mappings of nonexpansive type. By TECK-CHEONG LIM .... 69
A superposition theorem for bounded continuous functions. By STEPHEN DEMKO ..... 75
On asymptotic properties of several classes of operators. By STEPHEN L. CAMPBELL and RALPH GELLAR ........................................... 79
The domain of univalence of certain families of rational functions. By A. W. GOODMAN 85
Unitary parts of contractive Hankel matrices. By JEFFREY R. BUTZ ................. 91
Unitary parts of generalized Toeplitz operators. By JEFFREY R. BUTZ .............. 95
Operators in the commutant of a reductive algebra. By ROBERT L. MOORE ........ 99
Successive derivatives of entire functions. By SIMON HELLERSTEIN and JACK WIL-LIAMSON ................................................................. 105
The hyperbolicity of the complement of 2n + 1 hyperplanes in general position in Pn and related results. By MARK L. GREEN ............................................. 109

C. APPLIED MATHEMATICS

The Ising model limit of φ4 lattice fields. By JAY ROSEN ............................... 114

D. GEOMETRY

A Helly type theorem on the sphere. By MEIR KATCHALSKI ............................ 119

Continued on inside back cover