PROCEEDINGS

OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITED BY

FRED G. BRAUER

JACOB FELDMAN

GLEN E. BREDON RICHARD R. GOLDBERG

W. WISTAR COMFORT JOSEPH J. ROTMAN

GEORGE B. SELIGMAN

WITH THE COOPERATION OF

THOMAS A. CHAPMAN

JAY R. GOLDMAN

RONALD G. DOUGLAS

JAMES D. KUELBS

ROBERT I. SOARE

Coden: PAMYAR PAGES 1-220

VOLUME 39

JUNE 1973

NUMBER 1

WHOLE No. 168

Published by the AMERICAN MATHEMATICAL SOCIETY PROVIDENCE, RHODE ISLAND

Proceedings of the American Mathematical Society

This Journal is devoted entirely to research in pure and applied mathematics, and the publication of original papers of moderate length. The maximum length of an acceptable paper is about 8 printed pages. Since a page of the Proceedings contains about 400 words, a rule of thumb is that under 10 typed pages is probably within the limit, but that over 12 typed pages is probably too long.

SHORTER NOTES. Very short notes not to exceed 1 printed page of an unusual nature 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.

Preparation of the manuscript. Articles for insertion should be typewritten and double spaced. 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, it clearly done; directions to the printer should be included where necessary on a separate sheet, not in the accompanying letter. Authors must keep a complete copy of their manuscript, and editors will acknowledge receipt; manuscripts can therefore be sent by ordinary mail and any other kind (registered, certified) is entirely unnecessary. Submission of two copies of the manuscript is desirable.

FORM OF MANUSCRIPT. 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. Also avoid proper names unless mathematical usage associates them with the work. 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.

SUBMISSION OF MANUSCRIPTS, REPRINTS AND ADDRESS CHANGES. See the last page of this issue.

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.

BACKLOG. None. Two-thirds of the papers currently being received by the editors will be published in 8-11 months.

Subscription information. Five volumes are planned for 1973; the subscription price is \$100. Back number prices are as follows: Volumes 1–16, \$14 per volume, Volumes 17–19, \$18 per volume; Volumes 20–26, \$30 per volume; Volumes 27–30, \$27 per volume; Volumes 31–39, \$30 per volume.

THE PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY is published monthly. Subscriptions, orders for back numbers and inquiries in regard to nondelivery of current numbers should be addressed to the American Mathematical Society, P.O. Box 6248, Providence, R.I. 02904.

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

PROCEEDINGS

OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITED BY

FRED G. BRAUER

JACOB FELDMAN

GLEN E. BREDON

RICHARD R. GOLDBERG

W. WISTAR COMFORT

JOSEPH J. ROTMAN

GEORGE B. SELIGMAN

WITH THE COOPERATION OF

THOMAS A. CHAPMAN

JAY R. GOLDMAN

RONALD G. DOUGLAS

JAMES D. KUELBS

ROBERT I. SOARE

VOLUME 39 JUNE—AUGUST 1973

Published by the

AMERICAN MATHEMATICAL SOCIETY

PROVIDENCE, RHODE ISLAND



RESEARCH AND REVIEW JOURNALS PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY

Bulletin of the American Mathematical Society

This journal is the official organ of the Society. It reports official acts of the Society and the details of its meetings. It contains some of the officially invited addresses presented before the Society, reviews of advanced mathematical books, and a department of research announcements.

The current issue of the journal lists editors to whom prospective publications should be addressed. Publication is bimonthly.

Transactions of the American Mathematical Society

This monthly journal is devoted entirely to research in pure and applied mathematics, and includes in general longer papers than those in the PROCEEDINGS.

The current issue of the journal lists editors to whom prospective publications should be addressed.

Mathematics of Computation

A journal devoted to original papers in numerical analysis, the application of numerical methods and high-speed calculator devices, the computation of mathematical tables, the theory of high-speed calculating devices and other aids to computation. In addition it publishes reviews and notes in these and related fields.

Prospective publications should be addressed to the Editor, Professor Eugene Isaacson, Courant Institute of Mathematical Sciences, New York University, 251 Mercer Street, New York, New York 10012. The author may suggest the name of an editor for review of his paper.

Mathematical Reviews

This journal is devoted to abstracts and reviews of the current mathematical literature of the world. Currently publication is monthly; two volumes are published each year, each volume consisting of 6 regular issues plus an index issue. In each regular issue the abstracts and reviews are grouped under subject headings. Publication began in 1940.

Soviet Mathematics-Doklady

This bimonthly is a translation journal containing the entire pure mathematics section of the DOKLADY AKADEMII NAUK SSSR, the Reports of the Academy of Sciences of the USSR. The DOKLADY for a year contains about 500 articles, each about 4 pages long.

Mathematics of the USSR-Izvestija

This journal is a cover-to-cover translation of IZVESTIJA AKADEMII NAUK SSSR SERIJA MATEMATIČESKAJA, published bimonthly by the Academy of Sciences of the USSR. It is a journal of current research in all fields of pure mathematics. The translation is published bimonthly starting with Volume 1, Number 1, January-February 1967.

Mathematics of the USSR-Sbornik

This journal is a cover-to-cover translation of MATEMATIČESKIĬ SBORNIK (New Series), published monthly by the Moscow Mathematical Society and the Academy of Sciences of the USSR. It is a journal of current research in all fields of pure mathematics. The translation is published monthly starting with Volume 1, Number 1, January 1967.

Submission of Manuscript

Send papers directly to one of the editors listed under the subject field of the paper. Algebra and algebraic number theory.

BARBARA L. OSOFSKY, Department of Mathematics, Rutgers University, New Brunswick, New Jersey 08903

JOSEPH J. ROTMAN, Department of Mathematics, University of Illinois, Urbana, Illinois 61801

GEORGE B. SELIGMAN, Department of Mathematics, Yale University, New Haven, Connecticut 06520

Modern or classical analysis and analytic number theory.

RONALD G. DOUGLAS, Department of Mathematics, State University of New York at Stony Brook, Stony Brook, New York 11790

Legon Frederick Department of Mathematics, University of California, Barkeley,

Jacob Feldman, Department of Mathematics, University of California, Berkeley, California 94720

RICHARD R. GOLDBERG, Department of Mathematics, University of Iowa, Iowa City, Iowa 52240

Algebraic geometry.

GEORGE B. SELIGMAN, Department of Mathematics, Yale University, New Haven, Connecticut 06520

Set-theoretic and general topology.

THOMAS A. CHAPMAN, Department of Mathematics, University of Kentucky, Lexington, Kentucky, 40506

W. WISTAR COMFORT, Department of Mathematics, Wesleyan University, Middletown, Connecticut 06457

Algebraic topology and all other types of geometry.

GLEN E. BREDON, Department of Mathematics, Rutgers University, New Brunswick, New Jersey 08903

Applied mathematics, differential equations, and related areas of analysis.

FRED G. Brauer, Department of Mathematics, University of Wisconsin, Madison, Wisconsin 53706

Probability, statistics, and related fields.

JAMES D. KUELBS, Department of Mathematics, 213 Van Vleck Hall, University of Wisconsin, Madison, Wisconsin 53706

Logic, set theory, and related areas.

ROBERT I. SOARE, Department of Mathematics, University of Illinois at Chicago Circle, Chicago, Illinois 60680

Combinatorics and related areas of discrete mathematics.

JAY R. GOLDMAN, School of Mathematics, University of Minnesota, Minneapolis, Minnesota 55455

All other communications should be addressed to the Managing Editor, Joseph J. ROTMAN, at the above address.

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 02904.

CONTENTS—Continued from back cover

On some fundamental problems in cluster set theory. By J. A. EIDSWICK Stability implications on the asymptotic behavior of second order differential	163
equations. By John M. Bownds	169
On Bazilevič functions. By Petru T. Mocanu, Maxwell O. Reade and Eligiusz J. Złotkiewicz	173
0,2201112112021111111111111111111111111	175
E. LOGIC AND FOUNDATIONS	
	178 181
F. STATISTICS AND PROBABILITY	
On the lower bound of the number of real roots of a random algebraic equation with infinite variance. III. By G. SAMAL and M. N. MISHRA	184
G. TOPOLOGY	
Planar λ connected continua. By Charles L. Hagopian	190
On higher order nonsingular immersions of Dold manifolds. By Wei-Lung Ting. Extension d'un théorème de Louis Antoine, By Nikias Stavroulakis	195 201
Completions for a class of convergence groups. By G. D. RICHARDSON	211
Shorter Notes	
An extension of Kolmogorov's theorem for continuous covariances. By G. D.	
ALLEN	214 217
L^2 -solutions to $y'' + c(t)y' + a(t)b(y) = 0$. By Allan Kroopnick	219

JUNE 1973

Whole No. 168

	Page
A. Algebra and Number Theory	
Archimedean vector lattices generated by two elements. By ROGER D. BLEIER Rings satisfying monomial constraints. By Mohan S. Putcha and Adil Yaqub. Approximation of arithmetical functions by additive ones. By Janos Galambos Regular nonnegative matrices. By Robert J. Plemmons The number of field topologies on countable fields. By Klaus-Peter Podewski Transcendental extensions of field topologies on countable fields. By Klaus-Peter Podewski	1 10 19 26 33
The largest sum-free subsequence from a sequence of <i>n</i> numbers. By S. L. G. Choi	42 45 51 57
VINSONHALER	63
MICHAEL RICH	69 73
Chain type decomposition in integral domains. By RAYMOND A. BEAUREGARD Counting p-subgroups. By Ernst Snapper	77 81 83 86
B. Analysis	
C^k , weakly holomorphic functions on analytic sets. By Joseph Becker On a unilateral problem associated with elliptic operators. By Peter Hess On the radius of β -convexity of starlike functions of order α . By Hassoon S.	89 94
AL-AMIRI. L-analytic mappings in the disk algebra. By H. E. WARREN Almost Chebyshev subspaces, lower semicontinuity, and Hahn-Banach extensions.	101
By Edward Rozema On a Bergman-Whittaker type operator in five or more variables. By Dean K.	117
KUKRAL Multipliers for the space of almost-convergent functions on a semigroup. By CHING CHOU and J. PETER DURAN	122
Additivity and indefinite integration for McShane's P-integral. By C. H. SCANLON. On the self-intersections of the image of the unit circle under a polynomial map-	129
ping. By J. R. Quine	135
problems. By Leonard Sarason	141 149
HELTON	155

^{*} The volume index will contain a mapping showing the correspondence between sections A-G and the AMS (MOS) subject classification numbers.