PROCEEDINGS

OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITED BY

FRED G. BRAUER IRVING GLICKSBERG IRVING REINER

ARTHUR MATTUCK W. H. J. FUCHS ERNEST A. MICHAEL P. EMERY THOMAS

WITH THE COÖPERATION OF

W. W. BOONE JOSHUA CHOVER

S. M. SHAH HANS WEINBERGER

VOLUME 23, NUMBER 1 OCTOBER, 1969

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY PROVIDENCE, RHODE ISLAND

Proceedings of the American Mathematical Society

The PROCEEDINGS of the American Mathematical Society is devoted entirely to research in pure and applied mathematics, and the publication of original papers of moderate length. Articles for insertion should be typewritten and double spaced. Ditto is not generally satisfactory, although other modes of multiple reproduction may be. 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.) 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, 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.

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.). It should be at least one complete sentence, but not over 150 words, with the upper limit primarily for longer papers. The title should be short, but informative; useless or vague phrases such as "some remarks about" or "concerning" should be avoided. At the end of the article, placed before the first footnote, there should be first the A.M.S. *subject classification numbers* representing the primary and secondary subjects of the article, followed by a list of *key words* and *phrases* describing the subject matter of the article and taken from it. A list of subject classification numbers is printed at the end of each volume of Mathematical Reviews. See the June 1969 Notices for more details, as well as illustrative examples. Very short notes (not to exceed 1 printed page) of an unusual nature are also

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 of 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.)

Papers in algebra and number theory should be sent to ARTHUR MATTUCK, Room 2-275, Mathematics Department, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, or to IRVING REINER, Mathematics Department, University of Illinois, Urbana, Illinois 61801.

Papers in modern or classical analysis should be sent to IRVING GLICKSBERG, Mathematics Department, University of Washington, Seattle, Washington 98105, or to W. H. J. FUCHS, White Hall, Cornell University, Ithaca, New York 14850.

Papers in algebraic geometry should be sent to ARTHUR MATTUCK; papers in set-theoretic and general topology to ERNEST MICHAEL, Mathematics Department, University of Washington, Seattle, Washington 98105; in algebraic topology and all other types of geometry to P. EMERY THOMAS, Mathematics Department, University of California, Berkeley, California 94720.

Papers in applied mathematics, differential equations, and related areas of analysis should be sent to FRED BRAUER, Mathematics Department, University of Wisconsin, Madison, Wisconsin 53706.

Papers in probability, statistics, and related fields should be sent to JOSHUA CHOVER, Mathematics Department, University of Wisconsin, Madison, Wisconsin 53706.

Papers in logic, set theory, and related areas should be sent to W. W. BOONE, Mathematics Department, University of Illinois, Urbana, Illinois 61801.

All other communications should be addressed to the Managing Editor, ARTHUR MATTUCK, at the above address.

Inquiries from authors regarding reprints, or changes of addresses for mailing proofs, should be sent directly to the Editorial Department, American Mathematical Society, P. O. Box 6248, Providence, Rhode Island 02904.

Four volumes of three issues are planned for 1969. The subscription price is \$80.00 for the four volumes. Back issues of Volumes 1–16 are available at a price of \$14.00 each and Volumes 17–21 at a price of \$18.00 each.

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, 321 S. Main St., P. O. Box 6248, Providence, R. I. 02904. Second-class postage paid at Providence, Rhode Island and additional mailing offices.

> Copyright (2), American Mathematical Society, 1969 Printed in the United States of America

PROCEEDINGS

OF THE

American Mathematical Society

EDITED BY

FRED G. BRAUER W. H. J. FUCHS IRVING GLICKSBERG IRVING REINER

ARTHUR MATTUCK ERNEST A. MICHAEL

P. EMERY THOMAS

WITH THE COÖPERATION OF

W. W. BOONE JOSHUA CHOVER S. M. SHAH HANS WEINBERGER

VOLUME 23 **OCTOBER-DECEMBER 1969**

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY PROVIDENCE, RHODE ISLAND

GEORGE BANTA COMPANY, INC., MENASHA, WISCONSIN

Contents-Continued from back cover

On spaces of type $A(K)$ and their duals. By H. ELTON LACEY AND PETER D.	
Morris	151
The range of a vector-valued measure. By J. J. UHL, JR	158
Quasi-reflexivity and duals norms. By EMILE BOYD ROTH	164
A Lipschitzian characterization of convex polyhedra. By DAVID W. WALKUP	
and Roger JB. Wets	167
A note on the ideal structure of $C(X)$. By WILLIAM E. DIETRICH, JR	174
Extreme points of the unit cell in Lebesgue-Bochner function spaces. I. By	
K. Sundaresan	179
Upper bounds on the dimension of extendibility of submanifolds in C^n . By	
Stephen J. Greenfield	185
Pseudo-uniform convexity in H ¹ . By C. N. KELLOGG	190
An infinite dimensional version of a theorem of Bernstein. By GUILLERMO	
Restrepo	193
On the size of the set of left invariant means on a semigroup. By CHING CHOU.	199
Recursive functions defined by ordinal recursions. By R. J. FABIAN AND C. F.	
Kent	206

SHORTER NOTES

Trace and the convex hull of the spectrum in a von Neumann algebra of finite	
class. By S. K. Berberian	211
Isometries of the trace class. By BERNARD RUSSO	213

CONTENTS

Vol. 23, No. 1

OCTOBER, 1969

Whole No. 124

	a	

Quasi-invertibility in a staircase diagram. By WALTER NOLL	1
On groups with one defining relation having an abelian normal subgroup. By A. KARRASS AND D. SOLITAR	5
Extensions of group representations over fields of prime characteristic. By	
Burton Fein	11
A note on free groups. By R. G. BURNS	14
On a theorem by Leon Greenberg. By A. W. MASON	18
On equations of the Weiner-Hopf type in several complex variables. By EDGAR A. KRAUT.	24
Existence and uniqueness of solutions of ordinary differential equations. By	
DAVID V. V. WEND.	27
A Gronwall inequality for linear Stieltjes integrals. By J. V. HEROD A representation for the solution of Fredholm integral equations. By H. H.	34
KAGIWADA, R. E. KALABA AND A. SCHUMITZKY	37
Remarks on a certain hypothesis in singular perturbations. By K. W. CHANG.	41
On embeddings of compacta in euclidean space. By J. L. BRYANT	46
A new proof for the Hosay-Lininger theorem about crumpled cubes. By ROBERT	
J. DAVERMAN	52
A note on cardinal reflections in the category of uniform spaces. By GIOVANNI	
VIDOSSICH	55
On the near equicontinuity of transformation groups. By WILLIAM J. GRAY AND	
Fred A. Roberson	59
On ordering infinitely many small homeomorphisms. By JOHN COBB	64
On connectivity properties of finite-dimensional groups. By SIGMUND N. HUDSON.	68
A note on z-closed projections. By N. NOBLE	73
T_1 -complements of T_1 topologies. By B. A. ANDERSON AND D. G. STEWART	77
The breadth and dimension of a topological lattice. By TAE HO CHOE	82
A note concerning behaviour of iterated logarithm type. By C. C. HEYDE	85
On Berman's version of the Lévy-Baxter theorem. By PEGGY TANG STRAIT	91
Higher derivations of wildly ramified v-rings. By MARTIN N. HEINZER	94
On the conjugacy problem and Greendlinger's eighth-groups. By SEYMOUR	
LIPSCHUTZ	101
Independent recursive axiomatizability in arithmetic. By J. P. JONES	107
Almost recursive sets. By V. D. VUCKOVIC.	114
Compactness of limit sets and semiorbit closures. By ETHAN M. COVEN	120
On the covering of polyhedra by polyhedra. By A. J. HOFFMAN	123
Polyanalytic functions with equal modulus. By P. KRAJKIEWICZ AND W. BOSCH.	127
Remarks on the string of beads. By DONALD R. WILKEN	133
Some orthogonality preserving operators. By W. A. AL-SALAM AND A. VERMA.	136
Rademacher series with nondifferentiable sums. By J. R. MCLAUGHLIN	140
Summability of a Cauchy product series. By JOHN SWETITS	144
A remark on Neuwirth and Newman's paper: "Positive $H^{1/2}$ functions are con-	
stants." By Shinji Yamashita	147
Cluster sets of meromorphic functions. By J. E. MCMILLAN	148

Continued on inside back cover