PROCEEDINGS

OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITED BY

W. H. J. FUCHS IRVING GLICKSBERG IRVING REINER ARTHUR MATTUCK

E. A. MICHAEL EMERY THOMAS

W. R. WASOW

WITH THE COÖPERATION OF

W. W. BOONE

S. M. SHAH

JOSHUA CHOVER

HANS WEINBERGER

VOLUME 20, NUMBER 1 JANUARY, 1969

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY PROVIDENCE, RHODE ISLAND

Journals Published by the

American Mathematical Society

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.

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.)

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.

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 Wolfgang Wasow, 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.

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 17–19 at a price of \$18.00 each.

The American Mathematical Society also publishes the following journals which accept research papers: BULLETIN, TRANSACTIONS and MATHEMATICS OF COMPUTATION. For details and the list of editors, please consult a recent issue. Reviews of the current mathematical literature of the world are published in MATHEMATICAL REcurrent mathematical literature of the world are published in MATHEMATICAL REVIEWS; editorial correspondence for this journal should be sent to: 416 Fourth Street, Ann Arbor, Michigan 48103.

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

W. H. J. FUCHS

E. A. MICHAEL

IRVING GLICKSBERG IRVING REINER

ARTHUR MATTUCK

P. E. THOMAS

W. R. WASOW

WITH THE COÖPERATION OF

W. W. Boone

S. M. Shah

JOSHUA CHOVER

Hans Weinberger

VOLUME 20 1969

PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY PROVIDENCE, RHODE ISLAND

Contents—Continued from back cover

| Density of one graph along another. By J. B. Brown | 147 150 157 |
|--|-------------------|
| A remark on a theorem of A. Weil. By MORIKUNI GOTO | 163 |
| Continuous derivations on Banach algebras. By A. M. SINCLAIR | 166 |
| A theorem on the Hurewicz fiberings. By Soon-Kyu Kim | 171 |
| A lower bound for the dimension of certain G_{δ} sets in completely nor- | 455 |
| mal spaces. By J. B. WILKINSON. | 175 |
| Structure of hereditarily infinite dimensional spaces. By J. M. YOHE. On reconstructing a graph. By R. L. HEMMINGER | 179 185 |
| A differential in the Adams spectral sequence. By D. S. KAHN | 188 |
| On topological transformation groups. By LLOYD LININGER | 191 |
| Valuations on a commutative ring. By M. E. Manis | 193 |
| Rigidity of generalized uniserial and Frobenius algebras. By S. S. PAGE. | 199 |
| Formations of groups and π -decomposability. By H. LAUSCH | 203 |
| Determinants on semilattices. By Bernt Lindström | 207 |
| Tensor products of simple pure inseparable field extensions. By J. N. | |
| Mordeson and B. Vinograde | 209 |
| Self-injective semigroup rings for finite inverse semigroups. By R. | |
| Wenger | 213 |
| Critical groups and the lattice of varieties. By John Cossey | 217 |
| On quasi-local noetherian rings. By Gerhard Michler | 222 |
| Note on QF-1 algebras. By J. P. Jans | 225 |
| Galois endomorphisms of the torsion subgroup of certain formal groups. | |
| By Jonathan Lubin | 229 |
| Finite groups with pro-normal subgroups. By T. A. PENG | 232 |
| A remark on Prüfer rings. E. D. Davis | 235 |
| Open mappings and closed subsets of the domain in general metric | 000 |
| spaces. By J. E. KEESLING. | 238 |
| Relative interiors of convex hulls. By W. E. Bonnice and J. R. REAY. | 246 |
| A note on maximal locally compact semigroups. By J. W. STEPP A set whose square can map onto a perfect set. By J. R. ISBELL | 251 254 |
| An equivalence theorem for embeddings of compact absolute neighbor- | 234 |
| hood retracts. By J. L. Bryant and C. L. Seebeck III | 256 |
| On stochastic differentials in Hilbert spaces. By E. M. CABAÑA | 259 |
| Dominated estimates of positive contractions. By R. V. Chacon and | |
| J. Olsen | 266 |
| KLIMKO and Louis Sucheston | 272 |
| Almost complex submanifolds of the six sphere. By Alfred Gray | 277 |
| A canonical linear order for the maximal chains of a tree. By J. C. | 211 |
| Owings, Jr | 280 |
| | 200 |
| SHORTER NOTES | |
| Toeplitz-Hausdorff theorem on numerical ranges. By R. RAGHAVEN- | |
| DRAN | 284 |
| A note on absolute summability. By J. A. FRIDY | 285 |

CONTENTS

| Vol. 20, No. 1 | JANUARY, | 1969 | Whole No. | 115 |
|---|---------------------------------------|----------------------------|------------------------------|------------|
| Approximating semigroup | - and the consist | ones of differ | | Page |
| By GILBERT STRANG | | | | 1 |
| A coefficient inequality for F. R. Keogh and E. P. | or certain classes Merkes | of analytic | functions. By | 8 |
| A theorem on infinite pos REICHAW | | | YAHU and M. | 13 |
| A problem of Wiener and | the failure of a | principle for | | |
| with positive coefficient Minimal solutions to a class | ss of parabolic pa | rtial different | ial equations. | 16 |
| By T. Guinn and E. M Ellipticity and regularity | for periodic non | linear equation | ons. By R. A. | |
| A uniqueness theorem for s | some nonlinear bo | oundary value | problems. By | 24 |
| A. KADISH A note on eigenvalues of no Weierstrass points and ar | ormal transforma nalytic submanife | tions. By R. E | E. L. TURNER. mueller space. | 30 |
| By H. M. FARKAS A note on the Littlewood- | Tauber Theorem | By M. L. C | GLASSER | 35 |
| Normal operators. By My On a theorem of Fejér and | d Riesz. By F. R | . KEOGH | | 41 |
| Almost convergent and SCHAEFER | | | | 51 |
| The approximate diverger Comparison theorems and | d integral inequa | alities for Vol | terra integral | 55 |
| equations. By P. R. BE Oscillation theorems for lin | near second order | ordinary diff | erential equa- | 61 |
| tions. By J. W. MACKI Eigenvalue of the square | of a function. By | A. M. FINK. | | 67 73 |
| Extending real maps defin FORD and E. S. THOMAS | s, JR | | | 75 |
| The area and variation of ZIEMER | | | | 81 |
| Some properties of a general Convergence-preservation | alized Hausdorff criteria for a ge | mean. By C. Veneralized Ha | W. LEININGER usdorff mean. | 88 |
| By C. W. LEININGER Totally bounded sets of pre | ecompact linear o | perators. By | T. W. PALMER | 97 |
| Product solutions for simp The operator equation B | X - XA = Q with | selfadjoint. | A and B. By | 107 |
| Marvin Rosenblum Operators similar to their | adjoints. By J. I | P. WILLIAMS. | | 115 |
| Weak compactness of mea Sums of irreducible operate | ors. By P. A. FILI | LMORE and D. | M. TOPPING. | 124 131 |
| Charlier spaces of entire fu | | | | 134 |
| Fixed-point theorems for c L. P. Belluce and W. | ertain classes of 1 | nonexpansive | mappings. By | 141 |