PROCEEDINGS

OF THE

AMERICAN MATHEMATICAL SOCIETY

EDITED BY

FRED G. BRAUER W. H. J. FUCHS

ERNEST A. MICHAEL JOSEPH J. ROTMAN IRVING GLICKSBERG GEORGE B. SELIGMAN

EMERY THOMAS

WITH THE COOPERATION OF

W. W. Boone

Joshua Chover

Allen Shields

VOLUME 28, NUMBER 2 MAY, 1971

CODEN: PAMYAR

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, 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.

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 your 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, 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 two copies of the manuscript is helpful, but by no means necessary.

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

SUBSCRIPTION INFORMATION. Five volumes are planned for 1971. The subscription price is \$72. Back issues of Volumes 1-16 are available at a price of \$14 each. Volumes 17-19 at a price of \$18 each, and Volumes 20-27 at a price of \$30 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, P. O. Box 6248, Providence, R.I. 02904.

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

Copyright @, American Mathematical Society, 1971 Printed in the United States of America

AMS (MOS) MAJOR SUBJECT HEADINGS (1970)

The letters in parentheses indicate groupings which are used in the table of contents of each issue and in the volume index.

00	(H)	General	44	(B)	Integral Transforms,
01	(H)	History and Biography			Operational Calculus
02	(E)	Logic and Foundations	45	(B)	Integral Equations
04	(E)	Set Theory	46	(B)	Functional Analysis
05	(A)	Combinatorics	47	(B)	Operator Theory
06	(A)	Order, Lattices, Ordered	49	(B)	Calculus of Variations and
		Algebraic Structures			Optimal Control
08	(A)	General Mathematical	50	(D)	Geometry
		Systems	52	(D)	Convex Sets and Geometric
10	(A)	Number Theory			Inequalities
12	(A)	Algebraic Number Theory,	53	(D)	Differential Geometry
		Field Theory and Polynomials	54	(G)	General Topology
13	(A)	Commutative Rings and	55	(G)	Algebraic Topology
		Algebras	57	(G)	Manifolds and Cell Complexes
14	(A)	Algebraic Geometry	58	(G)	Global Analysis, Analysis on
15	(A)	Linear and Multilinear			Manifolds
		Algebra, Matrix Theory	60	(F)	Probability Theory and
		(finite and infinite)			Stochastic Processes
16	(A)	Associative Rings and	62	(F)	Statistics
		Algebras	65	(C)	Numerical Analysis
17	(A)	Nonassociative Rings and	68	(C)	Computer Science
		Algebras	70	(C)	Mechanics of Particles and
18	(A)	Category Theory,			Systems
		Homological Algebra	73	(C)	Mechanics of Solids
20	(A)	Group Theory and	76	(C)	Fluid Mechanics
		Generalizations	78	(C)	Optics, Electromagnetic
22	(G)	Topological Groups, Lie			Theory
	, ,	Groups	80	(C)	Classical Thermodynamics,
26	(B)	Real Functions			Heat Transfer
28	(B)	Measure and Integration	81	(C)	Quantum Mechanics
30	(B)	Functions of a Complex	82	(C)	Statistical Physics, Structure
	(-)	Variable			of Matter
31	(B)	Potential Theory	83	(C)	Relativity
32	(B)	Several Complex Variables	85	(C)	Astronomy and Astrophysics
	(2)	and Analytic Spaces	86	(C)	Geophysics
33	(B)	Special Functions	90	(C)	Economics, Operations Re-
34	(B)	Ordinary Differential			search, Programming, Games
34	(D)	Equations	92	(C)	Biology and Behavioral
35	(B)	Partial Differential Equations			Sciences
39	• •	Finite Differences and	93	(C)	Systems, Control
39	(B)	Functional Equations	94	(C)	Information and Communi-
40	(D)				cation, Circuits, Automata
40	(B)	Sequences, Series,	96	(H)	Mathematical Education,
	(7.)	Summability			Elementary
41	(B)	Approximations and	97	(H)	Mathematical Education,
		Expansions		/ - - :	Secondary
42	(B)	Fourier Analysis	98	(H)	Mathematical Education,
43	(B)	Abstract Harmonic Analysis			Collegiate

INDEX TO VOLUME 28

SUBJECT INDEX

* Starred items are "Shorter Notes"

A. Algebra and Number Theory

05. Combinatorics

Erdös, Paul and Kleitman, Daniel. On collections of subsets containing no 4-member Boolean algebra, 87.

06. Order, Lattices, Ordered Algebraic Structures

Chambless, Donald A. Representations of l-groups by almost-finite quotient maps, 50

Haskins, L. and Gudder, S. Semimodular posets and the Jordan-Dedekind chain condition, 395.

Hursey, R. J., Jr. On ordered polycyclic groups, 391.

Johnson, J. A. Quotients in Noetherian lattice modules, 71.

Olson, Milton Philip. The selfadjoint operators of a von Neumann algebra form a conditionally complete lattice, 537.

Stepp, J. W. Semilattices which are embeddable in a product of min intervals, 81. Stringall, R. W. Decompositions of Abelian p-groups, 409.

Venkatanarasimhan, P. V. Pseudo-complements in posets, 9.

08. General Mathematical Systems

Grätzer, G. and Padmanabhan, R. On idempotent, commutative, and nonassociative groupoids, 75.

10. Number Theory

Aizley, Paul. Multiplicative linear functionals on convolution algebras, 65.

Hall, Michael H. On the topological classification of the floors of certain Hilbert fundamental domains, 67.

Subbarao, M. V. Partition theorems for Euler pairs, 330.

Suryanarayana, D. and Rao, R. Sitaramachandra. On the order of the error function of the k-free integers, 53.

- * Uchiyama, S. On some products involving primes, 629.
- * Williams, Kenneth S. Note on a theorem of Pall, 315. Zee, Yun-Cheng. The Jacobi sums of order twenty-two, 25.

12. Algebraic Number Theory, Field Theory and Polynomials

Niederreiter, H. Orthogonal systems of polynomials in finite fields, 415.

13. Commutative Rings and Algebras

Bergman, George M. A weak Nullstellensatz for valuations, 32.

Heinzer, William. Integral ring extensions and prime ideals of infinite rank, 344. Johnson, E. W. and Lediaev, J. P. A new characterization of Dedekind domains, 63.

Jøndrup, Søren. p.p. rings and finitely generated flat ideals, 431.

14. Algebraic Geometry

Knighten, Carol M. Some consequences of dim proj $\Omega(A) < \infty$, 411.

15. Linear and Multilinear Algebra; Matrix Theory (finite and infinite)

Deutsch, Emeric. On vectorial norms and pseudonorms, 18.

Schaefer, H. H. On the characteristic roots of real matrices, 91.

16. Associative Rings and Algebras

* Barr, Michael and Knus, Max-Albert. Extensions of derivations, 313.

Brungs, H. H. Overrings of principal ideal domains, 44.

Golan, Jonathan S. Characterization of rings using quasiprojective modules. II, 337.

Hutchinson, John J. Quotient full linear rings, 375.

Jacobinski, H. Two remarks about hereditary orders, 1.

Johnson, R. E. Unique factorization monoids and domains, 397.

Jøndrup, Søren. p.p. rings and finitely generated flat ideals, 431.

Koh, Kwangil. On one sided ideals of a prime type, 321.

Montgomery, Susan. A generalization of a theorem of Jacobson, 366.

Osofsky, B. L. Loewy length of perfect rings, 352.

Riley, John A. The maximal ideals in quaternion orders, 436.

Wagoner, Ronald L. Cogenerator endomorphism rings, 347.

17. Nonassociative Rings and Algebras

McCrimmon, Kevin. Koecher's principle for quadratic Jordan algebras, 39. Putcha, Mohan S. On Lie rings satisfying the fourth Engel condition, 355. Stitzinger, Ernest L. Minimal nonnilpotent solvable Lie algebras, 47.

18. Category Theory, Homological Algebra

* Barr, Michael and Knus, Max-Albert. Extensions of derivations, 313.

* Sumners, D. W. H2 of the commutator subgroup of a knot group, 319.

Tarsy, Richard B. Global dimension of triangular orders, 423.

20. Group Theory and Generalizations

Bang, Chang Mo. Direct sums of countably generated modules over complete discrete valuation rings, 381.

Blau, Harvey I. An inequality for complex linear groups of small degree, 405.

Chambers, Graham A. On the conjugacy of injectors, 358.

Herzog, Marcel. On Burnside's lemma, 379.

Hill, E. T. Ideals in the modular group ring of a p-group, 389.

Hursey, R. J., Jr. On ordered polycyclic groups, 391.

Iyengar, H. R. Krishna. Semilattice of bisimple regular semigroups, 361.

Johnson, R. E. Unique factorization monoids and domains, 397.

Kuczkowski, Joseph E. On roots and subsemigroups of nilpotent groups, 50.

McCool, James. The power problem for groups with one defining relator, 427.

Passman, D. S. Idempotents in group rings, 371.

Stringall, R. W. Decompositions of Abelian p-groups, 409.

B. Analysis

28. Measure and Integration

Halpern, Benjamin. Mean convergence and compact subsets of L₁, 122.

Rigelhof, Roger. Invariant measures on locally compact semigroups, 173.

Stein, George H. Entropy and density, 505.

30. Functions of a Complex Variable

Duren, Peter L. Coefficients of meromorphic schlicht functions, 169.

Farkas, Hershel M. Abelian differentials with double zeros, 155.

Geveci, Tunc. On differentiability of minimal surfaces at a boundary point, 218.

Hengartner, Walter and Schober, Glenn. Analytic functions close to mappings convex in one direction, 519.

Marden, Morris. Logarithmic derivative of an entire function, 513.

Metzger, T. A. and Rao, K. V. Rajeswara. On integrable and bounded automorphic forms, 562.

Roach, F. A. The parabola theorem for continued fractions over a vector space, 137.

Robertson, M. S. A distortion theorem for analytic functions, 551.

Sastry, M. S. Krishna. A model of Euclidean 2-space, 114.

Warren, Hugh E. A Riemann mapping theorem for C(X), 147.

Wong, C. K. A uniformization theorem for arbitrary Riemann surfaces with signature, 489.

31. Potential Theory

Sibuya, Yasutaka. Almost periodic solutions of Poisson's equation, 195.

32. Several Complex Variables and Analytic Spaces

Hall, Michael H. On the topological classification of the floors of certain Hilbert fundamental domains, 67.

Yabuta, Kôzô. Unicity of the extremum problems in $H^1(U^n)$, 181.

34. Ordinary Differential Equations

* Fraker, Ross. A uniqueness theorem for certain two-point boundary value problems: A correction, 631.

Hale, J. K. and Ize, A. F. On the uniform asymptotic stability of functional differential equations of the neutral type, 100.

Kim, W. J. Simple zeros of solutions of nth-order linear differential equations, 557.

Leighton, Walter and Oo Kian Ke, William. A comparison theorem, 185.

Lovelady, David Lowell. Bounded solutions of Stieltjes integral equations, 127.

Schneider, Leo J. Oscillation properties of the 2-2 disconjugate fourth order self-adjoint differential equation, 545.

Wong, C. K. On the solutions of a sequence of Lamé differential equations, 481.

35. Partial Differential Equations

Sibuva, Yasutaka. Almost periodic solutions of Poisson's equation, 195.

* Taylor, Michael E. Analytic properties of elliptic and conditionally elliptic operators, 317.

40. Sequences, Series, Summability

Preston, C. J. On the convergence of multiplicatively orthogonal series, 453.

Roach, F. A. The parabola theorem for continued fractions over a vector space, 137.

41. Approximations and Expansions

Ize, A. F. On an asymptotic property of a Volterra integral equation, 93.

42. Fourier Analysis

Dunkl, Charles F. and Ramirez, Donald E. Multipliers on compact groups, 456. Friedberg, Stephen H. Functions which are Fourier-Stieltjes transforms, 451.

Nelson, Stuart. L^2 asymptotes for Fourier transforms of surface-carried measures, 134.

Preston, C. J. On the convergence of multiplicatively orthogonal series, 453.

Rigelhof, Roger. Invariant measures on locally compact semigroups, 173.

Sibuya, Yasutaka. Almost periodic solutions of Poisson's equation, 195.

43. Abstract Harmonic Analysis

Dunkl, Charles F. and Ramirez, Donald E. Multipliers on compact groups, 456. Rider, Daniel. Functions which operate in the Fourier algebra of a compact group, 525.

44. Integral Transforms, Operational Calculus

Walsh, T. On the existence of double singular integrals for kernels without smoothness, 439.

45. Integral Equations

Ize, A. F. On an asymptotic property of a Volterra integral equation, 93.

46. Functional Analysis

Bouldin, Richard. The Weyl essential spectrum, 531.

Brandstein, A. G. A class of hypo-Dirichlet algebras, 501.

* Bunce, John. A note on two-sided ideals in C*-algebras, 635.

Conway, John B. On algebras of operators with totally ordered lattice of invariant subspaces, 163.

Curtis, D. W. and McCoy, R. A. Stable homeomorphisms on infinite dimensional normed linear spaces, 496.

Deutsch, Emeric. On vectorial norms and pseudonorms, 18.

Lovelady, David Lowell. Bounded solutions of Stieltjes integral equations, 127.

Luchins, Edith H. Completion of norms for C(X, Q), 478.

Olson, Milton Philip. The selfadjoint operators of a von Neumann algebra form a conditionally complete lattice, 537.

Schneeberger, Charles. Commutators on a separable Lp-space, 464.

Shore, S. D. Decomposition of function-lattices, 189.

Sinclair, A. M. The norm of a hermitian element in a Banach algebra, 446.

Uhl, J. J., Jr. Abstract martingales in Banach spaces, 191.

* Veech, William A. Short proof of Sobczyk's Theorem, 627.

Warren, Hugh E. A Riemann mapping theorem for C(X), 147.

Wogen, W. R. On special generators for properly infinite von Neumann algebras, 107.

47. Operator Theory

Bouldin, Richard. The Weyl essential spectrum, 531.

Conway, John B. On algebras of operators with totally ordered lattice of invariant subspaces, 163.

Deddens, James A. Every isometry is reflexive, 509.

Harrison, K. J., Radjavi, Heydar and Rosenthal, Peter. A transitive medial subspace lattice, 119.

Howland, James S. Analyticity of determinants of operators on a Banach space, 177.

Putnam, C. R. The spectra of subnormal operators, 473.

Riddell, R. C. and Insley, R. B. Commuting operator solutions of algebraic equations, 461.

Schneeberger, Charles. Commutators on a separable Lp-space, 464.

* Wogen, W. R. On special generators for properly infinite von Neumann algebras, 107.

D. GEOMETRY

52. Convex Sets and Geometric Inequalities

Wayment, S. G. On congruence indices for simple closed curves, 199.

53. Differential Geometry

Chen, Bang-yen. On an integral formula of Gauss-Bonnet-Grotemeyer, 208.

Geveci, Tunc. On differentiability of minimal surfaces at a boundary point, 213.

Ruh, Ernst A. Minimal immersions of 2-spheres in S⁴, 219.

Vilms, Jaak. Nonlinear and direction connections, 567.

E. LOGIC AND FOUNDATIONS

0.2 Logic and Foundations

* Adler, Andrew. The cardinality of ultrapowers-An example, 311.

04. Set Theory

* Adler, Andrew. The cardinality of ultrapowers-An example, 311.

F. STATISTICS AND PROBABILITY

60. Probability Theory and Stochastic Processes

Brown, B. M. A general three series theorem, 573.

Rosencrans, Steven. An extremal property of stochastic integrals, 223.

G. Topology

22. Topological Groups, Lie Groups

Jenkins, J. W. Sigma-amenable locally compact groups, 621.

Mumford, David. A remark on Mahler's compactness theorem, 289.

Wilcox, Howard J. Dense subgroups of compact groups, 578.

54. General Topology

Bennett, Harold R. A note on point-countability in linearly ordered spaces, 598. Costich, O. L., Doyle, P. H. and Galewski, D. E. A characterization of punctured open 3-cells, 295.

Creede, Geoffrey D. Embedding of complete Moore spaces, 609.

George, J. H., Sehgal, V. M. and Smithson, R. E. Application of Liapunov's direct method to fixed point theorems, 613.

Geroch, Robert, Kronheimer, Erwin and McCarty, George. No topologies characterize differentiability as continuity, 273.

Hager, Anthony W. The projective resolution of a compact space, 262.

Isbell, John R. s admits an injective metric, 259.

Janos, Ludvik. On maximal groups of isometries, 584.

Jaworowski, Jan W. A fixed point theorem for manifolds, 275.

* Michael, Ernest. A theorem on perfect maps, 633.

Okuvama, Akihiro. A characterization of a space with countable infinity, 595.

Rogers, James T., Jr. and Tollefson, Jeffrey L. Homeomorphism groups of weak solenoidal spaces, 242.

Saks, Victor and Stephenson, R. M., Jr. Products of M-compact spaces, 279.

Smithson, R. E. Fixed points of order preserving multifunctions, 304.

Tamano, Hisahiro and Vaughan, J. E. Paracompactness and elastic spaces, 299.

Tondra, Richard J. The domain rank of open surfaces of infinite genus, 581.

Ward, L. E., Jr. Arcs in hyperspaces which are not compact, 254.

Wenner, B. R. Dimension-theoretic properties of completions, 590.

Wilder, B. E. Semigroups on acyclic plane continua, 587.

Williams, G. K. Continuous and proper decompositions, 267.

Wong, Raymond Y. T. A note on stable homeomorphisms of infinite-dimensional manifolds, 271.

55. Algebraic Topology

McPherson, James M. A sufficient condition for an arc to be nearly polyhedral, 229.

Murasugi, Kunio. The commutator subgroups of the alternating knot groups, 237. Sieradski, Allan J. An example of Hilton and Roitberg, 247.

* Sumners, D. W. H₂ of the commutator subgroup of a knot group, 319.

57. Manifolds and Cell Complexes

Costich, O. L., Doyle, P. H. and Galewski, D. E. A characterization of punctured open 3-cells, 295.

Curtis, D. W. and McCoy, R. A. Stable homeomorphisms on infinite dimensional normed linear spaces, 496.

Husch, L. S. A topological characterization of the dilation in Eⁿ, 234.

McPherson, James M. A sufficient condition for an arc to be nearly polyhedral, 229.

Tondra, Richard J. The domain rank of open surfaces of infinite genus, 581.

Wong, Raymond Y. T. A note on stable homeomorphisms of infinite-dimensional manifolds, 271.

Wood, John W. Klein bottles in circle bundles, 607.

H. MISCELLANEOUS FIELDS

96. Mathematical Education, Elementary

Smithson, R. E. Fixed points of order preserving multifunctions, 304.

AUTHOR INDEX

* Starred items are "Shorter Notes"

* Adler, Andrew. The cardinality of ultrapowers—An example, 311.

Aizley, Paul. Multiplicative linear functionals on convolution algebras, 65.

Bang, Chang Mo. Direct sums of countably generated modules over complete discrete valuation rings, 381.

* Barr, Michael and Knus, Max-Albert. Extensions of derivations, 313.

Bennett, Harold R. A note on point-countability in linearly ordered spaces, 598.

Bergman, George M. A weak Nullstellensatz for valuations, 32.

Blau, Harvey I. An inequality for complex linear groups of small degree, 405.

Bouldin, Richard. The Weyl essential spectrum, 531.

Brandstein, A. G. A class of hypo-Dirichlet algebras, 501.

Brown, B. M. A general three series theorem, 573.

Brungs, H. H. Overrings of principal ideal domains, 44.

* Bunce, John. A note on two-sided ideals in C*-algebras, 635.

Chambers, Graham A. On the conjugacy of injectors, 358.

Chambless, Donald A. Representations of l-groups by almost-finite quotient maps, 59.

Chen, Bang-yen. On an integral formula of Gauss-Bonnet-Grotemeyer, 208.

Conway, John B. On algebras of operators with totally ordered lattice of invariant subspaces, 163.

Costich, O. L., Doyle, P. H. and Galewski, D. E. A characterization of punctured open 3-cells, 295.

Creede, Geoffrey D. Embedding of complete Moore spaces, 609.

Curtis, D. W. and McCoy, R. A. Stable homeomorphisms on infinite-dimensional normed linear spaces, 496.

Deddens, James A. Every isometry is reflexive, 509.

Deutsch, Emeric. On vectorial norms and pseudonorms, 18.

Doyle, P. H. See Costich, O. L.

Dunkl, Charles F. and Ramirez, Donald E. Multipliers on compact groups, 456.

Duren, Peter L. Coefficients of meromorphic schlicht functions, 169.

Erdös, Paul and Kleitman, Daniel. On collections of subsets containing no 4-member Boolean algebra, 87.

Farkas, Hershel M. Abelian differentials with double zeros, 155.

* Fraker, Ross. A uniqueness theorem for certain two-point boundary value problems: A correction, 631.

Friedberg, Stephen H. Functions which are Fourier-Stieltjes transforms, 451.

Galewski, D. E. See Costich, O. L.

George, J. H., Sehgal, V. M. and Smithson, R. E. Application of Liapunov's direct method to fixed point theorems, 613.

Geroch, Robert, Kronheimer, Erwin and McCarty, George. No topologies characterize differentiability as continuity, 273.

Geveci, Tunc. On differentiability of minimal surfaces at a boundary point, 213.

Golan, Jonathan S. Characterization of rings using quasiprojective modules. II, 337.

Grätzer, G. and Padmanabhan, R. On idempotent, commutative, and nonassociative groupoids, 75.

Gudder, S. See Haskins, L.

Hager, Anthony W. The projective resolution of a compact space, 262.

Hale, J. K. and Ize, A. F. On the uniform asymptotic stability of functional differential equations of the neutral type, 100.

Hall, Michael H. On the topological classification of the floors of certain Hilbert fundamental domains, 67.

Halpern, Benjamin. Mean convergence and compact subsets of L1, 122.

Harrison, K. J., Radjavi, Heydar and Rosenthal, Peter. A transitive medial subspace lattice, 119.

Haskins, L. and Gudder, S. Semimodular posets and the Jordan-Dedekind chain condition, 395.

Heinzer, William. Integral ring extensions and prime ideals of infinite rank, 344.

Hengartner, Walter and Schober, Glenn. Analytic functions close to mappings convex in one direction, 519.

Herzog, Marcel. On Burnside's lemma, 379.

Hill, E. T. Ideals in the modular group ring of a p-group, 389.

Howland, James S. Analyticity of determinants of operators on a Banach space, 177.

Hursey, R. J., Jr. On ordered polycyclic groups, 391.

Husch, L. S. A topological characterization of the dilation in Eⁿ, 234.

Hutchinson, John J. Quotient full linear rings, 375.

Insley, R. B. See Riddell, R. C.

Isbell, John R. s admits an injective metric, 259.

Iyengar, H. R. Krishna. Semilattice of bisimple regular semigroups, 361.

Ize, A. F. On an asymptotic property of a Volterra integral equation, 93.

Ize, A. F. See Hale, J. K.

Jacobinski, H. Two remarks about hereditary orders, 1.

Janos, Ludvik. On maximal groups of isometries, 584.

Jaworowski, Jan W. A fixed point theorem for manifolds, 275.

Jenkins, J. W. Sigma-amenable locally compact groups, 621.

Johnson, E. W. and Lediaev, J. P. A new characterization of Dedekind domains, 63.

Johnson, J. A. Quotients in Noetherian lattice modules, 71.

Johnson, R. E. Unique factorization monoids and domains, 397.

Jøndrup, Søren. p.p. rings and finitely generated flat ideals, 431.

Kim, W. J. Simple zeros of solutions of nth-order linear differential equations, 557.

Kleitman, Daniel. See Erdös, Paul.

Knighten, Carol M. Some consequences of dim proj $\Omega(A) < \infty$, 411.

Knus, Max-Albert. See Barr, Michael.

Koh, Kwangil. On one sided ideals of a prime type, 321.

Kronheimer, Erwin. See Geroch, Robert.

Kuczkowski, Joseph E. On roots and subsemigroups of nilpotent groups, 50.

Lediaev, J. P. See Johnson, E. W.

Leighton, Walter and Oo Kian Ke, William. A comparison theorem, 185.

Lovelady, David Lowell. Bounded solutions of Stieltjes integral equations, 127.

Luchins, Edith H. Completion of norms for C(X, Q), 478.

McCarty, George, See Geroch, Robert.

McCool, James. The power problem for groups with one defining relator, 427.

McCoy, R. A. See Curtis, D. W.

McCrimmon, Kevin. Koecher's principle for quadratic Jordan algebras, 39.

McPherson, James M. A sufficient condition for an arc to be nearly polyhedral, 229.

Marden, Morris. Logarithmic derivative of an entire function, 513.

Metzger, T. A. and Rao, K. V. Rajeswara. On integrable and bounded automorphic forms, 562.

* Michael, Ernest. A theorem on perfect maps, 633.

Montgomery, Susan. A generalization of a theorem of Jacobson, 366.

Mumford, David. A remark on Mahler's compactness theorem, 289.

Murasugi, Kunio. The commutator subgroups of the alternating knot groups, 237.

Nelson, Stuart. L² asymptotes for Fourier transforms of surface-carried measures, 134.

Niederreiter, H. Orthogonal systems of polynomials in finite fields, 415.

Okuyama, Akihiro. A characterization of a space with countable infinity, 595.

Olson, Milton Philip. The selfadjoint operators of a von Neumann algebra form a conditionally complete lattice, 537.

Oo Kian Ke, William. See Leighton, Walter.

Osofsky, B. L. Loewy length of perfect rings, 352.

Padmanabhan, R. See Grätzer, G.

Passman, D. S. Idempotents in group rings, 371.

Preston, C. J. On the convergence of multiplicatively orthogonal series, 453.

Putcha, Mohan S. On Lie rings satisfying the fourth Engel condition, 355.

Putnam, C. R. The spectra of subnormal operators, 473.

Radjavi, Heydar. See Harrison, K. J.

Ramirez, Donald E. See Dunkl, Charles F.

Rao, K. V. Rajeswara. See Metzger, T. A.

Rao, R. Sitaramachandra. See Suryanarayana, D.

Riddell, R. C. and Insley, R. B. Commuting operator solutions of algebraic equations, 461.

Rider, Daniel. Functions which operate in the Fourier algebra of a compact group, 525.

Rigelhof, Roger. Invariant measures on locally compact semigroups, 173.

Riley, John A. The maximal ideals in quaternion orders, 436.

Roach, F. A. The parabola theorem for continued fractions over a vector space, 137.

Robertson, M. S. A distortion theorem for analytic functions, 551.

Rogers, James T., Jr. and Tollefson, Jeffrey L. Homeomorphism groups of weak solenoidal spaces, 242.

Rosencrans, Steven. An extremal property of stochastic integrals, 223.

Rosenthal, Peter. See Harrison, K. J.

Ruh, Ernst A. Minimal immersions of 2-spheres in S4, 219.

Saks, Victor and Stephenson, R. M., Jr. Products of M-compact spaces, 279.

Sastry, M. S. Krishna. A model of Euclidean 2-space, 114.

Schaefer, H. H. On the characteristic roots of real matrices, 91.

Schneeberger, Charles. Commutators on a separable L^p-space, 464.

Schneider, Leo J. Oscillation properties of the 2-2 disconjugate fourth order selfadjoint differential equation, 545.

Schober, Glenn. See Hengartner, Walter.

Sehgal, V. M. See George, J. H.

Shore, S. D. Decomposition of function-lattices, 189.

Sibuya, Yasutaka. Almost periodic solutions of Poisson's equation, 195.

Sieradski, Allan J. An example of Hilton and Roitberg, 247.

Sinclair, A. M. The norm of a hermitian element in a Banach algebra, 446.

Smithson, R. E. Fixed points of order preserving multifunctions, 304.

-----. See George, J. H.

Stein, George H. Entropy and density, 505.

Stephenson, R. M., Jr. See Saks, Victor.

Stepp, J. W. Semilattices which are embeddable in a product of min intervals, 81.

Stitzinger, Ernest L. Minimal nonnilpotent solvable Lie algebras, 47.

Stringall, R. W. Decompositions of Abelian p-groups, 409.

Subbarao, M. V. Partition theorems for Euler pairs, 330.

* Summers, D. W. H₂ of the commutator subgroup of a knot group, 319.

Suryanarayana, D. and Rao, R. Sitaramachandra. On the order of the error function of the k-free integers, 53.

Tamano, Hisahiro and Vaughan, J. E. Paracompactness and elastic spaces, 299.

Tarsy, Richard B. Global dimension of triangular orders, 423.

* Taylor, Michael E. Analytic properties of elliptic and conditionally elliptic operators, 317.

Tollefson, Jeffrey L. See Rogers, James T.

Tondra, Richard J. The domain rank of open surfaces of infinite genus, 581.

* Uchiyama, S. On some products involving primes, 629.

Uhl, J. J., Jr. Abstract martingales in Banach spaces, 191.

Vaughan, J. E. See Tamano, Hisahiro.

* Veech, William A. Short proof of Sobczyk's Theorem, 627.

Venkatanarasimhan, P. V. Pseudo-complements in posets, 9.

Vilms, Jaak. Nonlinear and direction connections, 567.

Wagoner, Ronald L. Cogenerator endomorphism rings, 347.

Walsh, T. On the existence of double singular integrals for kernels without smoothness, 439.

Ward, L. E., Jr. Arcs in hyperspaces which are not compact, 254.

Warren, Hugh E. A Riemann mapping theorem for C(X), 147.

Wayment, S. G. On congruence indices for simple closed curves, 199.

Wenner, B. R. Dimension-theoretic properties of completions, 590.

Wilcox, Howard J. Dense subgroups of compact groups, 578.

Wilder, B. E. Semigroups on acyclic plane continua, 587.

Williams, G. K. Continuous and proper decompositions, 267.

* Williams, Kenneth S. Note on a theorem of Pall, 315.

Wogen, W. R. On special generators for properly infinite vor Neumann algebras, 107.

Wong, C. K. On the solutions of a sequence of Lamé differential equations, 481.

- A uniformization theorem for arbitrary Riemann surfaces with signature, 489.

Wong, Raymond Y. T. A note on stable homeomorphisms of infinite-dimensional manifolds, 271.

Wood, John W. Klein bottles in circle bundles, 607.

Yabuta, Kôzô. Unicity of the extremum problems in $H^1(U^n)$, 181.

Zee, Yun-Cheng. The Jacobi sums of order twenty-two, 25.

CONTENTS—Continued from back cover

A uniformization theorem for arbitrary Riemann surfaces with signature. By	489
C. K. Wong. Stable homeomorphisms on infinite-dimensional normed linear spaces. By D. W.	
CURTIS and R. A. McCov	496 501
Entropy and density. By GEORGE H. STEIN	505
Every isometry is reflexive. By James A. Deddens	509 513
Analytic functions close to mappings convex in one direction. By WALTER	010
HENGARTNER and GLENN SCHOBERFunctions which operate in the Fourier algebra of a compact group. By DANIEL	519
RIDER The Weyl essential spectrum. By RICHARD BOULDIN	525 531
The selfadjoint operators of a von Neumann algebra form a conditionally com-	527
plete lattice. By Milton Philip Olson. Oscillation properties of the 2-2 disconjugate fourth order selfadjoint differential equation. By Leo J. Schneider.	537 545
A distortion theorem for analytic functions. By M. S. ROBERTSON	551
Кім	557
On integrable and bounded automorphic forms. By T. A. METZGER and K. V. RAJESWARA RAO	562
D. Geometry	
Nonlinear and direction connections. By JAAK VILMS	567
F. STATISTICS AND PROBABILITY	
A general three-series theorem. By B. M. Brown	573
G. Topology	
Dense subgroups of compact groups. By Howard J. WILCOX	578
The domain rank of open surfaces of infinite genus. By RICHARD J. TONDRA On maximal groups of isometries. By LUDVIK JANOS	581 584
Semigroups on acyclic plane continua. By B. E. WILDER	587
Dimension-theoretic properties of completions. By B. R. Wenner	590
A characterization of a space with countable infinity. By AKIHIRO OKUYAMA A note on point-countability in linearly ordered spaces. By HAROLD R. BENNETT	595 598
Klein bottles in circle boundles. By JOHN W. WOOD	607
Embedding of complete Moore spaces. By Geoffrey D. Creede	609
George, V. M. Sehgal and R. E. Smithson	613
Sigma-amenable locally compact groups. By J. W. Jenkins	621
SHORTER NOTES	
Short proof of Sobczyk's Theorem. By WILLIAM A. VEECH	627
On some products involving primes. By S. UCHIYAMA	629
tion. By Ross Fraker	631
A note on two-sided ideals in C*-algebras. By JOHN BUNCE	635
AMS (MOS) Major Subject Headings (1970)	637
Index to Volume 28	000

MAY, 1971

Whole No. 143

	Page
A. Algebra and Number Theory	
On one sided ideals of a prime type. By KWANGIL KOH. Partition theorems for Euler pairs. By M. V. SUBBARAO. Characterization of rings using quasiprojective modules. II. By JONATHAN S.	
Golan. Integral ring extensions and prime ideals of infinite rank. By William Heinzer. Cogenerator endomorphism rings. By Ronald L. Wagoner. Loewy length of perfect rings. By B. L. Osofsky. On Lie rings satisfying the fourth Engel condition. By Mohan S. Putcha. On the conjugacy of injectors. By Graham A. Chambers. Semilattice of bisimple regular semigroups. By H. R. Krishna Ivengar. A generalization of a theorem of Jacobson. By Susan Montgomery. Idempotents in group rings. By D. S. Passman. Quotient full linear rings. By John J. Hutchinson. On Burnside's lemma. By Marcel Herzog. Direct sums of countably generated modules over complete discrete valuation rings. By Chang Mo Bang. Ideals in the modular group ring of a ρ-group. By E. T. Hill. On ordered polycyclic groups. By R. J. Hursey, Jr. Semimodular posets and the Jordan-Dedekind chain condition. By L. Haskins and S. Gudder. Unique factorization monoids and domains. By R. E. Johnson. An inequality for complex linear groups of small degree. By Harvey I. Blau. Decompositions of Abelian ρ-groups. By R. W. Stringall. Some consequences of dim proj Ω (A) < ∞. By Carol M. Knighten. Orthogonal systems of polynomials in finite fields. By H. Niederreiter.	381 389 391
Global dimension of triangular orders. By Richard B. Tarsy	423 427 431 436
B. Analysis	
On the existence of double singular integrals for kernels without smoothness. By T. Walsh.	439
The norm of a hermitian element in a Banach algebra. By A. M. Sinclair Functions which are Fourier-Stieltjes transforms. By Stephen H. Friedberg On the convergence of multiplicatively orthogonal series. By C. J. Preston Multipliers on compact groups. By Charles F. Dunkl and Donald E.	446 451 453
RAMIREZ	456
R. B. Insley. Commutators on a separable L^p -space. By Charles Schneeberger. The spectra of subnormal operators. By C. R. Putnam. Completion of norms for $C(X, Q)$. By Edith H. Luchins. On the solutions of a sequence of Lamé differential equations. By C. K. Wong	
on the solutions of a sequence of Paint differential equations, by C. R. Word	101

Continued on inside back cover

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