Pacific Journal of Mathematics

VOLUME XXXII 1970

PACIFIC JOURNAL OF MATHEMATICS

EDITORS

H. SAMELSON Stanford University Stanford, California 94305

RICHARD PIERCE University of Washington

University of Washington Seattle, Washington 98105 J. DUGUNDJI

Department of Mathematics University of Southern California Los Angeles, California 90007

BASIL GORDON*

University of California Los Angeles, California 90024

ASSOCIATE EDITORS

E. F. BECKENBACH

B. H. NEUMANN

F. Wolf

K. Yoshida

SUPPORTING INSTITUTIONS

UNIVERSITY OF BRITISH COLUMBIA
CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIVERSITY OF CALIFORNIA
MONTANA STATE UNIVERSITY
UNIVERSITY OF NEVADA
NEW MEXICO STATE UNIVERSITY
OREGON STATE UNIVERSITY
UNIVERSITY OF OREGON
OSAKA UNIVERSITY
UNIVERSITY OF SOUTHERN CALIFORNIA

STANFORD UNIVERSITY UNIVERSITY OF TOKYO UNIVERSITY OF UTAH WASHINGTON STATE UNIVERSITY UNIVERSITY OF WASHINGTON

AMERICAN MATHEMATICAL SOCIETY CHEVRON RESEARCH CORPORATION TRW SYSTEMS NAVAL WEAPONS CENTER

Printed in Japan by International Academic Printing Co., Ltd., Tokyo, Japan

CONTENTS

Robert A. Adams, Compact Sobolev imbeddings for unbounded do-
mains
Shair Ahmad, Dynamical systems of characteristic 0+561
Charles A. Akemann and Bernard Russo, Geometry of the unit
sphere of a C*-algebra and its dual $\ldots \ldots \ldots \ldots \ldots 575$
H. P. Allen and J. C. Ferrar, Jordan algebras and exceptional
subalgebras of the exceptional algebra $E_{\scriptscriptstyle 6}$
Bernhard Amberg, Groups with maximum conditions
Tom M. Apostol, Möbius functions of order k
Philip Bacon, The compactness of countably compact spaces 587
David Barnette and Branko Grünbaum, Preassigning the shape of
a face
R. B. Barrar and H. L. Loeb, On the continuity of the nonlinear
Tschebyscheff operator
Stefan Bergman, On an initial value problem in the theory of
two-dimensional transonic flow patterns 29
L. Carlitz, Factorization of a special polynomial over a finite
field
Robert Craggs, Involutions of the 3-sphere which fix 2-spheres 307
Geoffrey D. Creede, Concerning semi-stratifiable spaces 47
Joe E. Cude, Compact integral domains
David W. Dean, Bor-Luh Lin and Ivan Singer, On k-shrinking and
k-boundedly complete bases in Banach spaces
F. R. DeMeyer, On automorphisms of separable algebras II 621
J. B. Derr, Generalized Sylow tower groups 633
Edmond D. Dixon, Matric polynomials which are higher com-
mutators
Raouf Doss, Some inclusions in multipliers643
R. L. Duncan, Some continuity properties of the Schnirelmann
density $II \dots \dots$
P. L. Duren and A. L. Shields, Coefficient multipliers of H^{ρ} and
B^p spaces
Mary R. Embry, The numerical range of an operator 647
Martin Engert, Finite dimensional translation invariant sub-
spaces
H. O. Fattorini, On a class of differential equations for vector-
valued distributions
J. C. Ferrar, See H. P. Allen and J. C. Ferrar
K. L. Fields, On the global dimension of residue rings 345
J. Froese, Domain-perturbed problems for ordinary linear dif-
ferential operators
Zdeněk Frolik, Absolute Borel and Souslin sets

Ronald Fulp, Tensor and torsion products of semigroups685
Howard Gorman, The Brandt condition and invertibility of mo-
$dules \ldots \ldots 351$
G. Grätzer and J. Płonka, On the number of polynomials of an
$idempotent\ algebra\ I\ldots\ldots\ldots\ldots\ldots$ 697
Newcomb Greenleaf and Walter Read, Positive holomorphic dif-
ferentials on Klein surfaces
Branko Grünbaum, See David Barnette and Branko Grünbaum
Charles B. Hallahan, Stability theorems for Lie algebras of deriva-
tions
Benjamin Halpern, A characterization of the circle and interval. 373
J. W. Heidel, Uniqueness, continuation, and nonoscillation for a
second order nonlinear differential equation
H. G. Helfenstein, Local isometries of flat tori
Leon Henkin, Extending Boolean operations
R. Hirshon, On Hopfian groups
M. Hochster, Totally integrally closed rings and extremal spaces . 767
A. E. Hurd, A uniqueness theorem for second order quasi-linear
hyperbolic equations
James F. Hurley, Composition series in Chevalley algebras 429
G. J. Janusz, Some remarks on Clifford's theorem and the Schur
$index \dots \dots$
J. W. Jenkins, Symmetry and nonsymmetry in the group algebras
of discrete groups
H. F. Kreimer, Outer Galois theory for separable algebras147
D. G. Larman and P. Mani, On visual hulls
Meira Lavie, Disconjugacy of linear differential equations in the
complex domain
J. D. Lawson, Lattices with no interval homomorphisms 459
R. R. Laxton, On groups of linear recurrences II. Elements of
finite order
Bor-Luh Lin, See David W. Dean, Bor-Luh Lin and Ivan Singer
Dong Hoon Lee, The adjoint group of Lie groups
H. L. Loeb, See R. B. Barrar and H. L. Loeb
James B. Lucke, Commutativity in locally compact rings 187
P. Mani, See D. G. Larman and P. Mani
Roger C. McCann, A classification of center-foci
Evelyn R. McMillan, On continuity conditions for functions 479
R. Mohanty and B. K. Ray, On the convergence of a trigonometric
integral
G. N. de Oliveira, A conjecture and some problems on permanents . 495
David Parrott and S. K. Wong, On the Higman-Sims simple group
of order $44,352,000$
Jerome L. Paul, Extending homeomorphisms
Jerome D. Faul, Extending nomeoniorphisms 11

J. Płonka, See G. Grätzer and J. Płonka
B. K. Ray, See R. Mohanty and B. K. Ray
Walter Read, See Newcomb Greenleaf and Walter Read
Michael Rich, On a class of nodal algebras
Emile Boyd Roth, Conjugate space representations of Banach
spaces
T. B. Rushing, Unknotting unions of cells
Peter Russell, Forms of the affine line and its additive group 527
Bernard Russo, See Charles A. Akemann and Bernard Russo
C. H. Scanlon, Rings of functions with certain Lipschitz pro-
perties
Rolf Schneider, On the projections of a convex polytope 799
Bert M. Schreiber, On the coset ring and strong Ditkin sets 805
Binyamin Schwarz, Totally positive differential systems 203
A. L. Shields, See P. L. Duren and A. L. Shields
Neil Shilkret, Non-Archimedean Gelfand theory541
Ivan Singer, See David W. Dean, Bor-Luh Lin and Ivan Singer
James M. Sloss, The bending of space curves into piecewise helical
$curves\ldots\ldots\ldots$. 231
James D. Stafney, Analytic interpolation of certain multiplier
$spaces \dots \dots$
Patrick N. Stewart, Semi-simple radical classes 249
E. L. Stout, Some remarks on varieties in polydiscs and bounded
holomorphic functions
Hiroyuki Tachikawa, On left QF-3 rings
A. E. Tong, Diagonal submatrices of matrix maps551
James E. Ward, III, Two-groups and Jordan algebras 821
G. F. Webb, Product integral representation of time dependent
nonlinear evolution equations in Banach spaces 269
S. K. Wong, See David Parrott and S. K. Wong

Pacific Journal of Mathematics

Bernhard Amberg, Groups with maximum conditions	
Tom M. Apostol, Möbius functions of order k	21
Stefan Bergman, On an initial value problem in the theory of two-	
dimensional transonic flow patterns	29
Geoffrey D. Creede, Concerning semi-stratifiable spaces	47
Edmond D. Dixon, Matric polynomials which are higher commutators	55
R. L. Duncan, Some continuity properties of the Schnirelmann density	
	65
P. L. Duren and A. L. Shields, Coefficient multipliers of H^p and B^p	
	69
H. O. Fattorini, On a class of differential equations for vector-valued	
distributions	79
Charles B. Hallahan, Stability theorems for Lie algebras of derivations	105
H. G. Helfenstein, Local isometries of flat tori	113
G. J. Janusz, Some remarks on Clifford's theorem and the Schur	
index	119
J. W. Jenkins, Symmetry and nonsymmetry in the group algebras of	
discrete groups	131
H. F. Kreimer, Outer Galois theory for separable algebras	147
D. G. Larman and P. Mani, On visual hulls	
R. R. Laxton, On groups of linear recurrences II. Elements of finite	
order	173
Dong Hoon Lee, The adjoint group of Lie groups	
James B. Lucke, Commutativity in locally compact rings	187
C. H. Scanlon, Rings of functions with certain Lipschitz properties	
Binyamin Schwarz, Totally positive differential systems	203
James M. Sloss, The bending of space curves into piecewise helical	
curves	231
James D. Stafney, Analytic interpolation of certain multiplier spaces	241
Patrick N. Stewart, Semi-simple radical classes	249
Hiroyuki Tachikawa, On left QF-3 rings	255
G. F. Webb, Product integral representation of time dependent nonlinear	
evolution equations in Banach spaces	.269
• • • • • • • • • • • • • • • • • • •	

Robert A. Adams, Compact Sobolev imbeddings for unbounded domains...... 1

PACIFIC JOURNAL OF MATHEMATICS

EDITORS

H. SAMELSON Stanford University Stanford, California 94305

RICHARD PIERCE University of Washington Seattle, Washington 98105 J. DUGUNDJI
Department of Mathematics
University of Southern California
Los Angeles, California 90007

BASIL GORDON*
University of California
Los Angeles, California 90024

ASSOCIATE EDITORS

E. F. BECKENBACH

B. H. NEUMANN

F. WOLF

K. Yoshida

SUPPORTING INSTITUTIONS

UNIVERSITY OF BRITISH COLUMBIA
CALIFORNIA INSTITUTE OF TECHNOLOGY
UNIVERSITY OF CALIFORNIA
MONTANA STATE UNIVERSITY
UNIVERSITY OF NEVADA
NEW MEXICO STATE UNIVERSITY
OREGON STATE UNIVERSITY
UNIVERSITY OF OREGON
OSAKA UNIVERSITY
UNIVERSITY OF SOUTHERN CALIFORNIA

STANFORD UNIVERSITY UNIVERSITY OF TOKYO UNIVERSITY OF UTAH WASHINGTON STATE UNIVERSITY UNIVERSITY OF WASHINGTON

AMERICAN MATHEMATICAL SOCIETY CHEVRON RESEARCH CORPORATION TRW SYSTEMS NAVAL WEAPONS CENTER

The Supporting Institutions listed above contribute to the cost of publication of this Journal, but they are not owners or publishers and have no responsibility for its content or policies.

Mathematical papers intended for publication in the *Pacific Journal of Mathematics* should be in typed form or offset-reproduced, double spaced with large margins. Underline Greek letters in red, German in green, and script in blue. The first paragraph or two must be capable of being used separately as a synopsis of the entire paper. It should not contain references to the bibliography. Manuscripts, in duplicate if possible, may be sent to any one of the four editors. Please classify according to the scheme of Math. Rev. 36, 1539-1546. All other communications to the editors should be addressed to the managing editor, Richard Arens, University of California, Los Angeles, California, 90024.

50 reprints are provided free for each article; additional copies may be obtained at cost in multiples of 50.

The Pacific Journal of Mathematics is published monthly. Effective with Volume 16 the price per volume (3 numbers) is \$8.00; single issues, \$3.00. Special price for current issues to individual faculty members of supporting institutions and to individual members of the American Mathematical Society: \$4.00 per volume; single issues \$1.50. Back numbers are available.

Subscriptions, orders for back numbers, and changes of address should be sent to Pacific Journal of Mathematics, 103 Highland Boulevard, Berkeley, California, 94708.

PUBLISHED BY PACIFIC JOURNAL OF MATHEMATICS, A NON-PROFIT CORPORATION Printed at Kokusai Bunken Insatsusha (International Academic Printing Co., Ltd.), 7-17, Fujimi 2-chome, Chiyoda-ku, Tokyo, Japan.

* Acting Managing Editor.