

**Pacific  
Journal of  
Mathematics**

VOLUME XCVI

1981

# PACIFIC JOURNAL OF MATHEMATICS

## EDITORS

DONALD BABBITT (Managing Editor)

University of California  
Los Angeles, California 90024

HUGO ROSSI

University of Utah  
Salt Lake City, UT 84112

C. C. MOORE and ANDREW OGG

University of California  
Berkeley, CA 94720

J. DUGUNDJI

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

R. FINN and J. MILGRAM

Stanford University  
Stanford, California 94305

## ASSOCIATE EDITORS

R. ARENS

E. F. BECKENBACH

B. H. NEUMANN

F. WOLF

K. YOSHIDA

## SUPPORTING INSTITUTIONS

UNIVERSITY OF ARIZONA

UNIVERSITY OF BRITISH COLUMBIA

CALIFORNIA INSTITUTE OF TECHNOLOGY

UNIVERSITY OF CALIFORNIA

MONTANA STATE UNIVERSITY

UNIVERSITY OF NEVADA, RENO

NEW MEXICO STATE UNIVERSITY

OREGON STATE UNIVERSITY

UNIVERSITY OF OREGON

UNIVERSITY OF SOUTHERN CALIFORNIA

STANFORD UNIVERSITY

UNIVERSITY OF HAWAII

UNIVERSITY OF TOKYO

UNIVERSITY OF UTAH

WASHINGTON STATE UNIVERSITY

UNIVERSITY OF WASHINGTON

## CONTENTS

### A — ALGEBRA AND NUMBER THEORY

H. Amara, <i>Groupe des classes et unite fondamentale des extensions quadratiques relatives a un corps quadratique imaginaire principal</i> . . . . .	1
G. M. Benkart and J. M. Osborn, <i>An investigation of real division algebras using derivations</i> . . . . .	265
T. C. Hurley, <i>Intersections of terms of polycentral series of free groups and free Lie algebras, II</i> . . . . .	111
R. D. Ketkar and N. Vanaja, <i>A note on FR-perfect modules</i> . .	141
M. Kikkawa, <i>On Killing-Ricci forms of Lie triple algebras</i> . .	153
R. W. Marsh, W. H. Mills, R. L. Ward, H. Rumsey, Jr. and L. R. Welch, <i>Round trinomials</i> . . . . .	175
W. H. Mills, See R. W. Marsh, W. H. Mills, R. L. Ward, H. Rumsey, Jr. and L. R. Welch	
J. M. Osborn, See G. M. Benkart and J. M. Osborn	
H. Rumsey, Jr., See R. W. Marsh, W. H. Mills, R. L. Ward, H. Rumsey, Jr. and L. R. Welch	
Y.-S. So, <i>Polynomial near-fields?</i> . . . . .	213
N. Vanaja, See R. D. Ketkar and N. Vanaja	
R. L. Ward, See R. W. Marsh, W. H. Mills, R. L. Ward, H. Rumsey, Jr. and L. R. Welch	
L. R. Welch, See R. W. Marsh, W. H. Mills, R. L. Ward, H. Rumsey, Jr. and L. R. Welch	

### B — ANALYSIS

D. S. Bridges, <i>On the isolation of zeroes of an analytic function</i> .	13
D. I. Cartwright and L. R. McMullen, <i>A structural criterion for the existence of infinite Sidon sets</i> . . . . .	301
Z. A. Chanturia, <i>On the absolute convergence of Fourier series of the classes <math>H^\omega \cap V[v]</math></i> . . . . .	37
J. F. Colombeau and M. C. Matos, <i>On some spaces of entire functions defined on infinite dimensional spaces</i> . . . . .	63
E. Hayashi, <i>The spectral density of a strongly mixing stationary Gaussian process</i> . . . . .	343
F. Hiai, M. Ohya and M. Tsukada, <i>Sufficiency, KMS condition and relative entropy in von Neumann algebras</i> . . . . .	99
C.-W. Ho and C. Morris, <i>A graph theoretic proof of Sharkovskiy's theorem on the periodic points of continuous functions</i> . .	361
A. Inoue, S. Ôta and J. Tomiyama, <i>Derivations of operator algebras into spaces of unbounded operators</i> . . . . .	389
W. B. Jurkat and G. Sampson, <i>On weak restricted estimates and</i>	

*endpoint problems for convolutions with oscillating kernels*

(1) . . . . . 405

G. Koumoullis, *Some topological properties of spaces of measures* . 419

M. C. Matos, See J. F. Colombeau and M. C. Matos

M. McAsey, *Invariant subspaces of non-selfadjoint crossed products* . . . . . 457

J. R. McMullen, See D. I. Cartwright and J. R. McMullen

C. Morris, See C.-W. Ho and C. Morris

M. Ohya, See F. Hiai, M. Ohya and M. Tsukada

S. Ôta, See A. Inoue, S. Ôta and J. Tomiyama

J. Peters, *Entropy of automorphisms on L.C.A. groups* . . . . 475

S. Saitoh, *A characterization of the adjoint L-kernel of Szegö type* . . . . . 489

G. Sampson, See W. B. Jurkat and G. Sampson

C. Schochet, *Topological methods for C\*-algebras, I: Spectral sequences* . . . . . 193

J. Tomiyama, See Inoue, S. Ôta and J. Tomiyama

D. W. Townsend, *Imaginary values of meromorphic functions in the disk* . . . . . 225

M. Tsukada, See F. Hiai, M. Ohya and M. Tsukada

K. Watanabe, *Coverings of a projective algebraic manifold* . . . 243

D — GEOMETRY

J. Leowicz, *Invariant manifolds for regular points* . . . . . 163

E — LOGIC AND FOUNDATIONS

M. M. Zuckerman, *Choosing  $\ell$ -element subsets of  $n$ -element sets* . 247

G — TOPOLOGY

G. Beer, *A natural topology for upper semicontinuous functions and a Baire category dual for convergence in measure* . . 251

A. J. Casson and J. L. Harer, *Some homology lens spaces which bound rational homology balls* . . . . . 23

E. Duda, *Pointwise periodic homeomorphisms on chainable continua* . . . . . 77

R. F. Gustafson, *A simple genus one knot with incompressible spanning surfaces arbitrarily high genus* . . . . . 81

J. L. Harer, See A. J. Casson and J. L. Harer

S. Hurvitz, *The automorphism groups of spaces and fibrations* . 371

W.-H. Lin, *Algebraic Kahn-Priddy theorem* . . . . . 435

H — COMBINATORICS

F. Hanlon, *The fixed-point partition lattices* . . . . . 319

R. E. Jamison-Waldner, <i>Partition numbers for trees and ordered sets</i> . . . . .	115
--	-----



# Pacific Journal of Mathematics

H. Amara, Groupe des classes et unite fondamentale des extensions quadratiques relatives a un corps quadratique imaginaire principal....	1
D. S. Bridges, On the isolation of zeroes of an analytic function.....	13
A. J. Casson and J. L. Harer, Some homology lens spaces which bound rational homology balls .....	23
Z. A. Chanturia, On the absolute convergence of Fourier series of the classes $H^w \cap V[v]$ .....	37
J. F. Colombeau and M. C. Matos, On some spaces of entire functions defined on infinite dimensional spaces.....	63
E. Duda, Pointwise periodic homeomorphisms on chainable continua .....	77
R. F. Gustafson, A simple genus one knot with incompressible spanning surfaces of arbitrarily high genus.....	81
F. Hiai, M. Ohya and M. Tsukada, Sufficiency, KMS condition and relative entropy in von Neumann algebras.....	99
T. C. Hurley, Intersections of terms of polycentral series of free groups and free Lie algebras, II .....	111
R. E. Jamison-Waldner, Partition numbers for trees and ordered sets.....	115
R. D. Ketkar and N. Vanaja, A note on FR-perfect modules.....	141
M. Kikkawa, On Killing-Ricci forms of Lie triple algebras.....	153
J. Lewowicz, Invariant manifolds for regular points .....	163
R. W. Marsh, W.H. Mills, R. L. Ward, H. Rumsey, Jr., and L. R. Welch, Found trinomials .....	175
C. Schochet, Topological methods for $C^*$ -algebras I: Spectral sequences...	193
Y.-S. So, Polynomial near-fields?.....	213
D. W. Townsend, Imaginary values of meromorphic functions in the disk..	225
K. Watanabe, Coverings of a projective algebraic manifold .....	243
M. M. Zukerman, Choosing $\angle$ -element subsets of $n$ -element sets .....	247

*Subject listing on back cover*

# PACIFIC JOURNAL OF MATHEMATICS

## EDITORS

DONALD BABBITT (Managing Editor)  
University of California  
Los Angeles, CA 90024

HUGO ROSSI  
University of Utah  
Salt Lake City, UT 84112

C. C. MOORE and ANDREW OGG  
University of California  
Berkeley, CA 94720

J. DUGUNDJI  
Department of Mathematics  
University of Southern California  
Los Angeles, CA 90007

R. FINN and J. MILGRAM  
Stanford University  
Stanford, CA 94305

## ASSOCIATE EDITORS

R. ARENS      E. F. BECKENBACH      B. H. NEUMANN      F. WOLF      K. YOSHIDA

## SUPPORTING INSTITUTIONS

UNIVERSITY OF ARIZONA  
UNIVERSITY OF BRITISH COLUMBIA  
CALIFORNIA INSTITUTE OF TECHNOLOGY  
UNIVERSITY OF CALIFORNIA  
MONTANA STATE UNIVERSITY  
UNIVERSITY OF NEVADA, RENO  
NEW MEXICO STATE UNIVERSITY  
OREGON STATE UNIVERSITY

UNIVERSITY OF OREGON  
UNIVERSITY OF SOUTHERN CALIFORNIA  
STANFORD UNIVERSITY  
UNIVERSITY OF HAWAII  
UNIVERSITY OF TOKYO  
UNIVERSITY OF UTAH  
WASHINGTON STATE UNIVERSITY  
UNIVERSITY OF WASHINGTON

---

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, (not dittoed), double spaced with large margins. Please do not use built up fractions in the text of the manuscript. However, you may use them in the displayed equations. 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. Please propose a heading for the odd numbered pages of less than 35 characters. Manuscripts, in triplicate, may be sent to any one of the editors. Please classify according to the scheme of Math. Reviews, Index to Vol. 39. Supply name and address of author to whom proofs should be sent. All other communications should be addressed to the managing editor, or Elaine Barth, University of California, Los Angeles, California, 90024.

50 reprints to each author are provided free for each article, only if page charges have been substantially paid. Additional copies may be obtained at cost in multiples of 50.

---

The *Pacific Journal of Mathematics* is issued monthly as of January 1966. Regular subscription rate: \$102.00 a year (6 Vols., 12 issues). Special rate: \$51.00 a year to individual members of supporting institutions.

Subscriptions, orders for numbers issued in the last three calendar years, and changes of address should be sent to Pacific Journal of Mathematics, P.O. Box 969, Carmel Valley, CA 93924, U.S.A. Old back numbers obtainable from Kraus Periodicals Co., Route 100, Millwood, NY 10546.

PUBLISHED BY PACIFIC JOURNAL OF MATHEMATICS, A NON-PROFIT CORPORATION

Printed at Kokusai Bunken Insatsusha (International Academic Printing Co., Ltd.).  
8-8, 3-chome, Takadanobaba, Shinjuku-ku, Tokyo 160, Japan.

Copyright © 1981 by Pacific Journal of Mathematics  
Manufactured and first issued in Japan