## Pacific

Journal of
Mathematics

## VOLUME CXVIII <br> 1985

# PACIFIC JOURNAL OF MATHEMATICS <br> <br> EDITORS 

 <br> <br> EDITORS}

Donald Babbitt (Managing Editor)
University of California Los Angeles, CA 90024
Charles R. DePrima
California Institute of Technology
Pasadena, CA 91125
R. Finn

Stanford University
Stanford, CA 94305

Hermann Flaschka
University of Arizona Tucson, AZ 85721
Ramesh A. Gangolli University of Washington Seattle, WA 98195
Robion Kirby
University of California Berkeley, CA 94720
C. C. Moore

University of California Berkeley, CA 94720

## Hugo Rossi

University of Utah
Salt Lake City, UT 84112
H. Samelson

Stanford University
Stanford, CA 94305
Harold Stark
University of California, San Diego
La Jolla, CA 92093

ASSOCIATE EDITORS

| R. Arens | E. F. Beckenbach <br> $(1906-1982)$ | 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

K. Alladi, Moments of additive functions and the sequence of shifted primes ..... 261
J. L. Brenner, Composition algebras of polynomials ..... 281
M. Dugas and R. Göbel, On radicals and products ..... 79
P. Erdős and A. Sárközy, Problems and results on additive properties of general sequences. I ..... 347
D. Estes, R. Guralnick, M. Schacher and E. Straus, Equations in prime powers ..... 359
R. Göbel, See M. Dugas and R. Göbel
B. Gordon, D. Sato and E. Straus, Binomial coefficients whose prod- ucts are perfect $k$ th powers ..... 393
R. Guralnick, See D. Estes, R. Guralnick, M. Schacher and E. Straus
A. W. Hales, Stable augmentation quotients of abelian groups ..... 401
D. L. Hilliker, An algorithm for computing the values of the rami- fication index in the Puiseux series expansions of an algebraic function ..... 427
G. Kolesnik, Primes of the form $\left[n^{c}\right]$ ..... 437
J. C. Lagarias, The set of primes dividing the Lucas numbers has density $2 / 3$ ..... 449
E. Lehmer, On special primes ..... 471
M. Newman, Sums of squares of matrices ..... 497
K. Rogers and E. G. Straus, Infinitely integer-valued polynomials over an algebraic number field ..... 507
A. Sárközy, See P. Erdős and A. Sárközy
D. Sato, Utterly integer valued entire functions (I) ..... 523
D. Sato, See B. Gordon, D. Sato and E. Straus
M. Schacher, See D. Estes, R. Guralnick, M. Schacher and E. Straus
A. Schinzel, Reducibility of polynomials in several variables. II ..... 531
R. Steinberg, Finite subgroups of $S U_{2}$, Dynkin diagrams and affine Coxeter elements ..... 587
E. Straus, See D. Estes, R. Guralnick, M. Schacher and E. StrausE. Straus, See B. Gordon, D. Sato and E. StrausE. G. Straus, See K. Rogers and E. G. StrausO. Taussky, Ideal matrices. III599

## B - ANALYSIS

D. Amir, On Jung's constant and related constants in normed linear spaces ..... 1
A. Aziz, On the location of the zeros of certain composite polyno- mials ..... 17
A. M. Bruckner, M. Rosenfeld and L. A. Rubel, The Darboux property and solutions of algebraic differential equations ..... 295
A. S. Cavaretta, Jr., A. Sharma and R. S. Varga, A theorem of J. L. Walsh, revisited ..... 313
A. El Kohen, A hyperbolic problem ..... 105
P. Lockhart and E. G. Straus, Relations between the maximum modulus and maximum term of entire functions ..... 479
M. Miklavčič, Stability for semilinear parabolic equations with non- invertible linear operator ..... 199
E. Mues and R. Redheffer, Über eine Differentialungleichung m-ter Ordnung im Komplexen ..... 487
R. Neidinger and H. P. Rosenthal, Norm-attainment of linear func- tionals on subspaces and characterizations of Tauberian opera- tors ..... 215
R. Redheffer, See E. Mues and R. RedhefferM. Rosenfeld, See A. M. Bruckner, M. Rosenfeld and L. A. RubelH. P. Rosenthal, See R. Neidinger and H. P. RosenthalL. A. Rubel, See A. M. Bruckner, M. Rosenfeld and L. A. Rubel
A. Sharma, See A. S. Cavaretta, Jr., A. Sharma and R. S. Varga
E. G. Straus, See P. Lockhart and E. G. Straus
R. S. Varga, See A. S. Cavaretta, Jr., A. Sharma and R. S. Varga
D - GEOMETRY
M. A. Magid, Lorentzian isoparametric hypersurfaces ..... 165
E - LOGIC AND FOUNDATIONS
J. Barback, On hereditarily odd-even isols and a comparability of summands property ..... 27
H. Gonshor, Remarks on the Dedekind completion of a nonstandard model of the reals ..... 117
F - PROBABILITY AND STATISTICS
P. Diaconis and R. L. Graham, The Radon transform on $\mathbf{Z}_{2}^{k}$ ..... 323
B. R. Gelbaum, Some theorems in probability theory ..... 383
R. L. Graham, See P. Diaconis and R. L. Graham

## G - TOPOLOGY

M. Brin, K. Johannson and P. Scott, Totally peripheral 3-manifolds ..... 37
R. F. Brown, A topological bound on the number of distinct zeros of an analytic function ..... 53
K. C. Chattopadhyay, Not every Lodato proximity is covered ..... 59
B. Diamond, Some priorities of almost rimcompact spaces ..... 63
K. Johannson, See M. Brin, K. Johannson and P. Scott
W. Kazez, On equivalences of branched coverings and their action on homology ..... 133
D. C. Kent, On the Wallman order compactification ..... 159
P. Scott, See M. Brin, K. Johannson and P. Scott
J. Vermeer, Closed subspaces of $H$-closed spaces ..... 229
H - COMBINATORICS
R. Aharoni, I. B.-A. Hartman and A. J. Hoffman, Path partitions and packs of acyclic digraphs ..... 249
J. Arkin, An extension of $E$. G. Straus' perfect Latin 3 -cube of or- der 7 ..... 277
A. A. Bruen and B. L. Rothschild, Lower bounds on blocking sets ..... 303
A. S. Fraenkel and J. Nešetril, Epidemiography ..... 369
L. H. Harper, On a continuous analog of Sperner's problem ..... 411
I. B.-A. Hartman, See R. Aharoni, I. B.-A. Hartman and A. J. Hoffman
A. J. Hoffman, See R. Aharoni, I. B.-A. Hartman and A. J. HoffmanD. H. Lehmer, The chromatic polynomial of a graph463
J. Nešetril, See A. S. Fraenkel and J. Nešetřil
B. L. Rothschild, See A. A. Bruen and B. L. Rothschild
H. G. Senge, Reconstruction of hypertrees ..... 565
J. Spencer, Asymptotically good coverings ..... 575

## Pacific Journal of Mathematics

D. Amir, On Jung's constant and related constants in normed linear spaces ..... 1
A. Aziz, On the location of the zeros of certain composite polynomials ..... 17
J. Barback, On hereditarily odd-even isols and a comparability of summands property ..... 27
M. Brin, K. Johannson and P. Scott, Totally peripheral 3-manifolds ..... 37
R. F. Brown, A topological bound on the number of distinct zeros of an analytic function ..... 53
K. C. Chattopadhyay, Not every Lodato proximity is covered ..... 59
B. Diamond, Some priorities of almost rimcompact spaces ..... 63
M. Dugas and R. Göbel, On radicals and products ..... 79
A. El Kohen, A hyperbolic problem ..... 105
H. Gonshor, Remarks on the Dedekind completion of a nonstandard model of the reals ..... 117
W. Kazez, On equivalences of branched coverings and their action on homology ..... 133
D. C. Kent, On the Wallman order compactification ..... 159
M. A. Magid, Lorentzian isoparametric hypersurfaces ..... 165
M. Miklavčič, Stability for semilinear parabolic equations with noninvertible linear operator ..... 199
R. Neidinger and H. P. Rosenthal, Norm-attainment of linear functionals on sub- spaces and characterizations of Tauberian operators ..... 215
J. Vermeer, Closed subspaces of $H$-closed spaces ..... 229

# PACIFIC JOURNAL OF MATHEMATICS EDITORS 

Donald Babbitt (Managing Editor)<br>University of California<br>Los Angeles. CA 90024<br>Charles R. DePrima<br>California Institute of Technology<br>Pasadena. CA 91125<br>R. Finn<br>Stanford University<br>Stanford. CA 94305

Hermann Flaschka<br>University of Arizona<br>Tucson, AZ 85721<br>Ramesh A. Gangolli<br>University of Washington<br>Seattle, WA 98195<br>Robion Kirby<br>University of California<br>Berkeley, CA 94720<br>C. C. Moore<br>University of California<br>Berkeley, CA 94720

Hugo Ross
University of Utah
Salt Lake City, UT 84112
H. Samelson

Stanford University
Stanford, CA 94305
Harold Stark
University of California, San Diego
La Jolla, CA 92093

ASSOCIATE EDITORS
$\begin{array}{ccccc}\text { R. Arens } & \begin{array}{c}\text { E. F. Beckenbach } \\ (1906-1982)\end{array} & \text { B. H. Neumann } & \text { F. Wolf } & \text { K. Yoshida }\end{array}$
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 must be capable of being used separately as a synopsis of the entire paper. In particular it should contain no bibliographic references. 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.

There are page-charges associated with articles appearing in the Pacific Journal of Mathematics. These charges are expected to be paid by the author's University, Government Agency or Company. If the author or authors do not have access to such Institutional support these charges are waived. Single authors will receive 50 free reprints; joint authors will receive a total of 100 free reprints. 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: $\$ 190.00$ a year ( 5 Vols., 10 issues). Special rate: $\$ 66.00$ 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.

The Pacific Journal of Mathematics at P.O. Box 969, Carmel Valley, CA 93924 (ISSN 0030-8730) publishes 5 volumes per year. Application to mail at Second-class postage rates is pending at Carmel Valley, California, and additional mailing offices. Postmaster: Send address changes to Pacific Journal of Mathematics, P.O. Box 969. Carmel Valley, CA 93924.

# PUBLISHED BY PACIFIC JOURNAL OF MATHEMATICS, A NON-PROFIT CORPORATION <br> Copyright © 1985 by Pacific Journal of Mathematics 

