# ILLINOIS JOURNAL OF MATHEMATICS a quarterly journal published by the UNIVERSITY OF ILLINOIS, URBANA

edited by

MAHLON M. DAY MARY-ELIZABETH HAMSTROM HARRY KESTEN ARUNAS LIULEVICIUS HANS SAMELSON JOHN H. WALTER

## ILLINOIS JOURNAL OF MATHEMATICS

## **Manuscripts**

Original research papers in pure and applied mathematics intended for publication in this journal may be written in English, French, German, or Italian. They should be addressed to the Illinois Journal of Mathematics, University of Illinois, Urbana, Illinois 61801, or to one of the editors:

MAHLON M. DAY, Department of Mathematics, University of Illinois, Urbana, Illinois 61801.

MARY-ELIZABETH HAMSTROM, Department of Mathematics, University, of Illinois, Urbana, Illinois 61801.

HARRY KESTEN, Department of Mathematics, Cornell University, Ithaca, New York, 14850

ARUNAS LIULEVICIUS, Department of Mathematics, The University of Chicago, Chicago, Illinois 60637.

HANS SAMELSON, Department of Mathematics, Stanford University. Stanford, California 94305.

JOHN H. WALTER, Department of Mathematics, University of Illinois, Urbana, Illinois 61801.

All papers should be typewritten, double spaced, and the author should keep a complete copy. Bibliography and footnotes should be typed, double spaced, on separate sheets of paper. Figures should be drawn separately in black ink on white paper suitable for being photographed and reduced (lettering included) to half size.

### Proof

Authors will receive only galley proof. Proof sent to North American addresses will be accompanied by manuscript and sent by first class mail. To other addresses, proof will be sent by airmail, and manuscript will be sent only if requested. Authors are asked to return proof (and manuscript if sent) by the same class of mail that was used in sending it to them.

## Reprints

One hundred free reprints are supplied to the sole author of a paper; fifty free reprints are supplied to each author of a joint paper. Additional reprints may be purchased from Waverly Press.

Copyright @ 1970, Board of Trustees, University of Illinois

Made in U.S.A.

The ILLINOIS JOURNAL OF MATHEMATICS is published quarterly by the University of Illinois. Entered as second-class matter June 4, 1957 at the post office at Urbana, Illinois, under the act of August 24, 1912. Office of publication, University of Illinois Press, Urbana, Ill.

# ILLINOIS JOURNAL OF MATHEMATICS

a quarterly journal published by the UNIVERSITY OF ILLINOIS, URBANA

edited by

MAHLON M. DAY MARY-ELIZABETH HAMSTROM HARRY KESTEN ARUNAS LIULEVICIUS HANS SAMELSON JOHN H. WALTER

. . . . . . . . . .

. . . . .

# Volume 14

AKUTOWICZ, E. J., Espaces de Hilbert pour lesquels l'approximation spectrale est impossible en general	198–204
BECKER, JAMES C., Extensions of cohomology theories	551-584
BENDER, HELMUT, On the uniqueness theorem	376-384
BERGER, T. R., Class two <i>p</i> -groups as fixed point free automorphism groups	121–149
Berndt, Bruce C., On the zeros of a class of Dirichlet series I $\ .$ $\ .$	244-258
———, On the zeros of a class of Dirichlet series II	678-691
BITZER, CARL W., Stieltjes-Volterra integral equations	434–451
BRAUER, RICHARD, On the first main theorem on blocks of charac- ters of finite groups	183–187
BUCKLEY, JOSEPH T., Polynomial functions and wreath products .	274–282
CAMINA, A. R. and GAGEN, T. M., Some non-soluble factoriable groups	91–98
CLOUGH, ROBERT R., The $Z_2$ cohomology of a candidate for $B_{\text{Im}(J)}$	424–433
CONNELL, E. H., Characteristic classes	496–521
CROWELL, R. H., $H_2$ of subgroups of knot groups	665-674
DIAMOND, HAROLD G., Asymptotic distribution of Beurling's general- ized integers	12–28
, A set of generalized numbers showing Beurling's theorem to be sharp	29-34
DORNHOFF, LARRY, On imprimitive solvable rank 3 permutation groups	692–707
DUREN, P. L. and TAYLOR, G. D., Mean growth and coefficients of $H^p$ functions $\ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots$	419–423
DYER, JAMES A., Integral bases in linear topological spaces	468-477
DYM, H. and McKEAN, H. P., JR., Applications of De Branges spaces of integral functions to the prediction of stationary Gaussian processes	299–343
ECKMAN, BENO and STAMMBACH, URS, On exact sequences in the homology of groups and algebras	205–215

ESTES, DENNIS and PALL, GORDON, The definite octonary quadratic forms of determinant 1	159–163
FINE, N. J., In a question of Ayoub, Chowla and Walum concerning character sums	88–90
FRITSCH, RUDOLF, Some remarks on S. Weingram: On the triangula- tion of a semisimplicial complex	529–535
FULLER, KENT R., Double centralizers of injectives and projectives over Artinian rings	658-664
GAGEN, T. M., with CAMINA, A. R., Some non-soluble factorizable groups	91–98
GLASNER, MOSES and KATZ, RICHARD, The Royden boundary of a Riemannian manifold	488-495
GLICKFELD, B. W., On an inequality of Banach algebra geometry and semi-inner product space theory	76-81
GOODRICK, RICHARD E., Numerical invariants of knots	414-418
GORMAN, HOWARD, Invertibility of modules over Prüfer rings	283-298
HAIMO, DEBORAH TEPPER, Series expansions and integral represen- tations of generalized temperatures	621–629
HASSETT, MATTHEW J., A mapping property of regressive isols	478-487
HERZOG, MARCEL, On finite groups with a cyclic Sylow subgroup .	188–193
Hochschild, G., Algebraic groups and Hopf algebras	52 - 65
HUFF, ROBERT E., Some applications of a general lemma on in- variant means	216-221
ISAACS, I. M., Invariant and extendible group characters	70–75
JACO, WILLIAM and McMILLAN, D. R., JR., Retracting three-mani- folds onto finite graphs	150–158
JOHNSON, WILLIAM, Finite-dimensional Schauder decompositions in $\pi_{\lambda}$ and dual $\pi_{\lambda}$ spaces	642-647
KATZ, RICHARD, with GLASNER, Moses, The Royden boundary of a Riemannian manifold	488-495
KLEIN, AARON, Relations in categories	536-550
KNILL, R. J., Q-simplicial spaces	40-51
KNUDSON, DAVID W., A characterization of a class of rigid algebras.	113-120

KONVISSER, MARC W., Metabelian <i>p</i> -groups which contain a self- centralizing element	557
LARMORE, LAWRENCE L., The first obstruction to embedding a 1- complex in a 2-manifold	1
LEE, D. H. and WU, T. S., On conjugacy of homomorphisms of topo- logical groups II	<b>413</b>
LEVITT, NORMAN, Normal fibrations for complexes	<b>40</b> 8
LLOYD, S. P., Subalgebras in a subspace of $C(X)$	267
MARTIN, JOSEPH, 3-manifolds with disjoint spines are products 178-1	181
McKEAN, H. P., JR., with DYM, H., Applications of De Branges spaces of integral functions to the prediction of stationary Gaussian processes	343
McMillan, D. R., Jr., with Jaco, William, Retracting three- manifolds onto finite graphs	158
MITCHELL, THEODORE, Topological semigroups and fixed points 630-6	341
Monk, G. S., Abelian <i>p</i> -groups without proper isomorphic pure dense subgroups	177
MUELLER, BRUNO J., On semi-perfect rings	467
MUKHOTI, S., A limitation theorem for Cesàro summable series 66-6	69
PALL, GORDON, with ESTES, DENNIS, The definite octonary quadra- tic forms of determinant 1	163
PAYNE, STANLEY E., A nonexistence theorem for relative difference sets	649
PRICE, J. J., Haar series and adjustment of functions on small sets . 82-	87
PRIDDY, STEWART B., Primary cohomology operations for simplicial Lie algebras	612
RENEKE, JAMES A., In the existence and representation of integrals . 99-	112
ROGERS, JAMES TED, JR., Pseudo-circles and universal circularly chainable continua	237
SAWOROTNOW, PARFENY P., Representation of a complemented algebra on a locally compact space	677
SCHENKMAN, EUGENE, The number of Hall $\pi$ -subgroups of a finite group	243

SCHMIDT, ROLAND, Modular subgroups of finite groups II
Sнан, G. M., On the zeros of Stieltjes and Van Vleck polynomials $\$ . 522–528
Sons, L. R., On the Macintyre conjecture
STAMMBACH, URS, with ECKMAN, BENO, On exact sequences in the homology of groups and algebras
STOLARSKY, KENNETH B., Certain semigroups of linear fractional transformations contain elements of arbitrarily large trace 238–240
TAYLOR, G. D., with DUREN, P. L., Mean growth and coefficients of $H^p$ -functions
Ton, Bui An, On the asymptotic behavior of the spectral function of elliptic pseudo-differential operators
TOWBER, JACOB, Local rings with the outer product property 194-197
VASCONCELOS, WOLMER V., Quasi-normal rings
WANG, S. P., Some properties of lattices in a Lie group 35-39
WU, T. S., with LEE, D. H., On conjugacy of homomorphisms of topological groups II
ZABRODSKY, ALEXANDER, Implications on the cohomology of H- spaces