

PROCEEDINGS
OF THE
AMERICAN MATHEMATICAL SOCIETY

EDITED BY
GUSTAV A. HEDLUND NATHAN JACOBSON
A. C. SCHAEFFER

WITH THE ASSISTANCE OF

C. B. ALLENDOERFER	P. T. BATEMAN	R. H. BING
J. B. DIAZ	N. J. FINE	A. W. GOODMAN
G. P. HOCHSCHILD	I. M. SHEFFER	MAX SHIFFMAN
	E. H. SPANIER	

VOLUME 2, NUMBER 2
APRIL, 1951

PUBLISHED BY THE SOCIETY
MENASHA, WIS., AND NEW YORK

Journals Published by the American Mathematical Society

Bulletin of the American Mathematical Society

This journal is the official organ of the Society. It reports official acts of the Society and the details of its meetings, with abstracts of all research papers presented. It contains some of the officially invited addresses presented before the Society. It contains also announcements and notes on matters of current interest, and reviews of advanced mathematical books.

One volume of six numbers is planned for 1951. The subscription price is \$7.00. Sets of volumes of the BULLETIN are available as follows: vols. 1–36 (1894–1930), \$7.00 each; vols. 37–53 (1931–1947), \$9.00 each; vols. 54–55 (1948–1949), \$11.00 each; vol. 56 (1950), \$7.00.

Proceedings of the American Mathematical Society

This journal is devoted entirely to research in pure and applied mathematics, and is devoted principally to the publication of original papers of moderate length. Volume 1 appeared in 1950.

One volume of six numbers is planned for 1951. The subscription price is \$11.00. Vol. 1 (1950) is available at the price of \$11.00.

Transactions of the American Mathematical Society

This journal is devoted entirely to research in pure and applied mathematics, and includes in general longer memoirs than the PROCEEDINGS.

Normally, two volumes of three numbers each are published annually. The price per volume is \$6.00. Volumes 1–36 (1900–1934) consist of four numbers each. Volumes 66–67 (1949) consist of two numbers each. Sets of volumes are available as follows: vols. 1–21 (1900–1920), \$7.00 each; vols. 22–32 (1921–1930), \$8.00 each; vols. 33–36 (1931–1934), \$9.00 each; vols. 37–69 (1935–1950), \$6.00 each.

Mathematical Reviews

This journal contains abstracts and reviews of the current mathematical literature of the world. It is sponsored by thirteen mathematical organizations, located both in the United States and abroad.

The publication of MATHEMATICAL REVIEWS was begun in 1940. It appears monthly, excepting July, and the price per annual volume is \$20.00. Orders for complete volumes only are accepted. Volumes 1–11 (1940–1950) are available at \$20.00 per volume.

The PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY is published bimonthly, in February, April, June, August, October, and December. Price per annual volume is \$11.00. Subscriptions, orders for back numbers, and inquiries in regard to nondelivery of current numbers should be addressed to the American Mathematical Society, 450 Ahnaip Street, Menasha, Wis., or Low Memorial Library, 531 West 116th Street, New York 27, N.Y.

Entered as second-class matter at the post office at Menasha, Wisconsin. Authorization is granted under the authority of the act of August 24, 1912, as amended by the act of August 4, 1947 (sec. 34.21, P. L. & R.).

Copyright, American Mathematical Society, 1951

Books Published by the American Mathematical Society

Colloquium Publications

35.	A. C. Schaeffer and D. C. Spencer, Coefficient regions for schlicht functions , 1950, xvi, 311 pp.	\$6.00
34.	J. L. Walsh, The location of critical points of analytic and harmonic functions , 1950, viii, 384 pp.	6.00
33.	J. F. Ritt, Differential algebra , 1950, viii, 184 pp.	4.40
32.	R. L. Wilder, Topology of manifolds , 1949, x, 402 pp.	7.00
31.	E. Hille, Functional analysis and semi-groups , 1948, xii, 528 pp.	7.50
30.	T. Radó, Length and area , 1948, vi, 572 pp.	6.75
29.	A. Weil, Foundations of algebraic geometry , 1946, xx, 288 pp.	5.50
28.	G. T. Whyburn, Analytic topology , 1942; reprinted, 1948, x, 280 pp.	4.75
27.	S. Lefschetz, Algebraic topology , 1942; reprinted, 1948, vi, 393 pp.	6.00
26.	N. Levinson, Gap and density theorems , 1940, viii, 246 pp.	4.00
25.	G. Birkhoff, Lattice theory , 1940; enlarged and completely revised edition, 1949, xiv, 283 pp.	6.00
24.	A. A. Albert, Structure of algebras , 1939, xii, 210 pp.	4.00
23.	G. Szegő, Orthogonal polynomials , 1939; reprinted, 1949, x, 403 pp.	6.00
22.	C. N. Moore, Summable series and convergence factors , 1938, vi, 105 pp.	2.00
21.	J. M. Thomas, Differential systems , 1937, x, 118 pp.	2.00
20.	J. L. Walsh, Interpolation and approximation by rational functions in the complex domain , 1935, x, 382 pp.	6.00
19.	R. E. A. C. Paley and N. Wiener, Fourier transforms in the complex domain , 1934; reprinted, 1949, viii, 184 pp. + portrait plate.	3.75
18.	M. Morse, The calculus of variations in the large , 1934; reprinted, 1948, x, 368 pp.	5.75
17.	J. H. M. Wedderburn, Lectures on matrices , 1934; reprinted, 1946; reprinted, 1949, x, 205 pp.	3.35
16.	G. A. Bliss, Algebraic functions , 1933; reprinted, 1948, x, 220 pp.	3.75
14.	J. F. Ritt, Differential equations from the algebraic standpoint , 1932; reprinted, 1948, x, 172 pp.	3.00
11.	D. Jackson, The theory of approximation , 1930; reprinted, 1946, viii, 178 pp.	3.35
10.	A. B. Coble, Algebraic geometry and theta functions , 1929; reprinted, 1948, viii, 282 pp.	4.00
9.	G. D. Birkhoff, Dynamical systems , 1927; reprinted, 1948, viii, 295 pp.	4.25
8.	L. P. Eisenhart, Non-Riemannian geometry , 1927; reprinted, 1949, viii, 184 pp.	2.70
3.	E. Kasner, Differential-geometric aspects of dynamics , 1913; reprinted, 1934; reprinted, 1948, iv, 117 pp.	2.50

Mathematical Surveys

6.	C. Chevalley, Introduction to the theory of algebraic functions of one variable , xii, 188 pp. To appear soon.	4.00
5.	S. Bergman, The kernel function and conformal mapping , 1950, viii, 161 pp.	4.00
4.	O. F. G. Schilling, The theory of valuations , 1950, viii, 253 pp.	6.00
3.	M. Marden, The geometry of the zeros of a polynomial in a complex variable , 1949, x, 181 pp.	5.00
2.	N. Jacobson, The theory of rings , 1943; reprinted, 1949, vi, 151 pp.	3.35
1.	J. A. Shohat and J. D. Tamarkin, The problem of moments , 1943; reprinted, 1950, xiv, 144 pp.	3.35

Semicentennial Publications

2.	E. T. Bell, J. F. Ritt, N. Wiener, E. J. McShane, T. Y. Thomas, R. L. Wilder, G. C. Evans, J. L. Synge, and G. D. Birkhoff, Semicentennial addresses , 1938, vi, 315 pp.	\$4.50
1.	R. C. Archibald, A semicentennial history of the American Mathematical Society 1888-1938 , with biographies and bibliographies of the past presidents, 1938, xii, 261 pp. + 30 plates.	3.00

Proceedings of Symposia in Applied Mathematics

2.	Electromagnetic theory , 1950, iv, 91 pp.	3.00
1.	Non-linear problems in mechanics of continua , 1949, iv, 219 pp.	5.25

The price to members of the American Mathematical Society is 25% less than list.
Volumes which are not listed above are out of print.

CONTENTS

Vol. 2, No. 2

APRIL, 1951

Whole No. 8

	Page
A characterization of plane light open mappings. By M. K. FORT.....	175
The closure of types of connected sets. By P. M. SWINGLE....	178
Games and sub-games. By SEYMOUR SHERMAN.....	186
Numerical inverting of matrices of high order. II. By H. H. GOLDSTINE and JOHN VON NEUMANN.....	188
On series of Walsh eigenfunctions. By W. H. SPRAGENS.....	202
On a theorem of Rådström. By P. ERDÖS.....	205
Approximation to conjugate functions. By PAUL CIVIN.....	207
A theorem on subharmonic functions. By WALTER RUDIN....	209
Certain properties of functions harmonic within a sphere. By E. P. MILES.....	213
Non-measurable sets and the equation $f(x+y)=f(x)+f(y)$. By ISRAEL HALPERIN.....	221
On fixed points for semi-groups of linear operators. By BERTRAM YOOD.....	225
On one-parameter semi-groups of linear transformations. By R. S. PHILLIPS.....	234
Mean values and Frullani integrals. By R. P. AGNEW.....	237
Pattern integration. By R. E. CARR and J. D. HILL.....	242
On the minimum of a certain integral. By A. SPITZBART.....	246
On conformal mapping of regions bounded by smooth curves. By S. E. WARSCHAWSKI.....	254
An extension of the nomogramic instrument. By H. D. RUDERMAN.....	262
Collineations in Weyl spaces of two dimensions. By JACK LEVINE.....	264
A note on the space L_p^* . By J. SCHWARTZ.....	270
A theorem in the geometry of matrices. By JOSEPHINE MITCHELL.....	276
Arithmetical definitions in the ring of integers. By R. M. ROBINSON.....	279
A theorem on locally euclidean groups. By G. D. MOSTOW....	285
A theorem on the derivations of Jordan algebras. By R. D. SCHAFER.....	290
Algebraic homogeneous spaces over fields of characteristic two. By JEAN DIEUDONNÉ.....	295
Powers of a matrix over a lattice. By W. R. UTZ.....	305
Some remarks on commutators. By OYSTEIN ORE.....	307
Note on a lemma of A. W. Goodman. By E. G. RODEJA F....	314
Number of integers in an assigned A , $P \leq x$ and prime to primes greater than x^ϵ . By V. RAMASWAMI.....	318
Remarks on minimal identities for algebras. By A. S. AMITSUR and J. LEVITZKI.....	320
Canonical coordinates at a point for two skew-symmetric tensors. By G. H. F. GARDNER.....	328

Articles for insertion in the Proceedings should be typewritten, double spaced, and the author should keep a complete copy. Papers in algebra and theory of numbers should be sent to NATHAN JACOBSON, Leet Oliver Memorial Hall, Yale University, New Haven 11, Conn.; in analysis to A. C. SCHAEFFER, North Hall, University of Wisconsin, Madison 6, Wis.; in other fields to G. A. HEDLUND, Leet Oliver Memorial Hall, Yale University, New Haven 11, Conn. All other communications to the editors should be addressed to the Managing Editor, NATHAN JACOBSON, Leet Oliver Memorial Hall, Yale University, New Haven 11, Conn.