# JOURNALS PUBLISHED BY THE AMERICAN MATHEMATICAL SOCIETY 

TRANSLATION JOURNALS

Soviet Mathematics-Doklady is a bimonthly translation journal containing the entire pure mathematics section of the DOKLADY AKADEMII NAUK SSSR, the Reports of the Academy of Sciences in the USSR. DOKLADY publishes 500 articles a year, each about four pages long.

Mathematics of the USSR-Izvestija, a bimonthly journal is a cover-to-cover translation of IZVESTIJA AKADEMII NAUK SSSR SERIJA MATEMATICESKAJA, published by the Academy of Sciences of the USSR. This is a journal of current research in all fields of pure mathematics.

Mathematics of the USSR-Sbornik is a monthly journal and is a cover-to-cover translation of MATEMATIČESKIĬ SBORNIK (NOVAJA SERIJA), published by the Moscow Mathematical Society and the Academy of Sciences of the USSR. This is a journal of current research in all fields of pure mathematics.

Theory of Probability and Mathematical Statistics is the cover-to-cover translation into English of the TEORIJA VEROJATNOSTEİ I MATEMATIČESKAJA STATISTIKA published by Kiev University, beginning with the 1970 Soviet publication.

Vestnik of the Leningrad University (Mathematics) is the complete translation into English of the mathematics section of the VESTNIK LENINGRADSKOGO UNIVERSITETA, beginning with the Soviet publication of 1968. All fields of mathematics are covered.

Transactions of the Moscow Mathematical Society is a translation into English of TRUDY MOSKOVSKOGO MATEMATICESKOGO OBS゙CESTVA which contains the results of original research in pure mathematics.

Proceedings of the Steklov Institute of Mathematics is a translation of the PROCEEDINGS OF THE STEKLOV INSTITUTE OF MATHEMATICS IN THE ACADEMY OF SCIENCES OF THE USSR. Issues contain book length articles or collections of articles pertaining to the same topic.

# CONTENT AND SUBMISSION INFORMATION FOR RESEARCH JOURNALS 

Bulletin (New Series) of the American Mathematical Society. Contains Research-Expository Papers, Research Announcements and Reviews of Books on Advanced Mathematics. See inside front cover for submission information.

Mathematics of Computation is a quarterly journal devoted to original papers in numerical analysis, the application of numerical methods and high-speed calculator devices, the computation of mathematical tables, the theory of high-speed calculating devices, and other aids to computation. In addition, reviews and notes in these and related fields are published. Prospective publications should be sent to the Editor, JAMES H. BRAMBLE, Center for Applied Mathematics, 275 Olin Hall, Cornell University, Ithaca, NY 14853.

Memoirs of the American Mathematical Society is a bimonthly journal constituting a series of paperbound research tracts which are of the same general character as the papers published in the TRANSACTIONS. An issue of the MEMOIRS is made up of one or more numbers; a number contains either a single monograph or a group of cognate papers. Copy is supplied by the author; information on preparation of camera copy may be obtained by writing to the Editorial Department of the American Mathematical Society. Papers should be sent to the appropriate editor of TRANSACTIONS.

Proceedings of the American Mathematical Society is a monthly journal devoted entirely to research in pure and applied mathematics, principally to the publication of original papers of moderate length. A department called Shorter Notes was established for the purpose of publishing very short papers of an unusually elegant and polished character for which there is normally no other outlet.

Send papers directly to one of the editors listed under the subject field of the paper. The numbers in parentheses are the first two digits of major classifications from the AMS (MOS) Subject Classification Scheme (1970) and describe the fields being handled by the editor. LOGIC AND FOUNDATIONS (02 04)

Paul C. Eklof, Department of Mathematics, University of California, Irvine, California 92717
COMBINATORICS AND DISCRETE MATHEMATICS (05 15)
Thomas H. Brylawski, Department of Mathematics, University of North Carolina, Chapel Hill, North Carolina 27514
COMMUTATIVE ALGEBRA ( 061213141518$)$
David Eisenbud, Department of Mathematics, Brandeis University, Waltham, Massachusetts 02154
GENERAL ALGEBRA (16 1718 08)
Robert L. Wilson, Department of Mathematics, Rutgers University, New Brunswick, New Jersey 08903

## GROUP THEORY (20)

David M. Goldschmidt, Department of Mathematics, University of California at Berkeley, Berkeley, California 94720
ALGEBRAIC AND DIFFERENTIAL TOPOLOGY (55 57 58)
Reinhard E. Schultz, Department of Mathematics, Purdue University, West Lafayette, Indiana 47907
REAL VARIABLES (26 28 40)
J. Jerry Uhl, Jr., Department of Mathematics, University of Illinois, Urbana, Illinois 61801
COMPLEX VARIABLES AND NUMBER THEOR Y (10 30 32)
W. E. Kirwan, Department of Mathematics, University of Maryland, College Park, Maryland 20742
Lawrence A. Zalcman, Department of Mathematics, University of Maryland, College Park, Maryland 20742
DIFFERENTIAL EQUATIONS (33 343539 49)
George R. Sell, School of Mathematics, University of Minnesota, Minneapolis, Minnesota 55455
GENERAL ANALYSIS (41 424344 45)
Richard R. Goldberg, Department of Mathematics, Vanderbilt University, Nashville, Tennessee 37235
FUNCTIONAL ANALYSIS AND OPERATOR THEORY (46 47)
Ronald G. Douglas, Department of Mathematics, State University of New York at Stony Brook, Stony Brook, New York 11790
FUNCTIONAL ANAL YSIS AND CONVEXITY (46 52)
Robert R. Phelps, Department of Mathematics GN-50, University of Washington, Seattle, Washington 98195
COMPLEX VARIABLES, FUNCTIONAL ANALYSIS AND OPERATOR THEORY (30 4647 )
Donald E. Sarason, Department of Mathematics, University of California at Berkeley, Berkeley, California 94720
LIE GROUPS AND GEOMETRY (22 50 53)
Joseph A. Wolf, Department of Mathematics, University of California at Berkeley, Berkeley, California 94720
GENERAL TOPOLOGY (54)
David J. Lutzer, Department of Mathematics, Texas Tech University, Lubbock, Texas 79409
Thomas A. Chapman, Department of Mathematics, University of Kentucky, Lexington, Kentucky 40506
PROBABILITY AND OTHER FIELDS (31 60-99 inclusive)
Thomas G. Kurtz, Department of Mathematics, University of Wisconsin, Madison, Wisconsin 53706
All other communications should be addressed to the Managing Editor, Joseph A. Wolf, at the above address.

Transactions of the American Mathematical Society is a monthly journal devoted entirely to research in pure and applied mathematics and, in general, includes longer papers than those in the PROCEEDINGS. Manuscripts should be submitted to one of the following editors.

Two copies of mathematical papers intended for publication in the TRANSACTIONS or the MEMOIRS should be addressed to one of the editors. Subjects, and the editors associated with them, follow:

Real analysis (excluding harmonic analysis) and applied mathematics to ROBERT T. SEELEY, Department of Mathematics, University of Massachusetts-Boston, Harbor Campus, Boston, MA 02125.

Harmonic and complex analysis to R. O. WELLS, JR., Department of Mathematics, Rice University, P. O. Box 1892, Houston, Texas 77001.
Abstract analysis to W. A. J. LUXEMBURG, Department of Mathematics 253-37, California Institute of Technology, Pasadena, CA 91125.

Algebra and number theory (excluding universal algebras) to MICHAEL ARTIN, Department of Mathematics, Room 2-239, Massachusetts Institute of Technology, Cambridge, MA 02139.
Logic, foundations, universal algebras and combinatorics to SOLOMON FEFERMAN, Department of Mathematics, Stanford University, Stanford, CA 94305.

Topology to JAMES D. STASHEFF, Department of Mathematics, University of North Carolina, Chapel Hill, NC 27514.

Global analysis and differential geometry to ALAN D. WEINSTEIN, Department of Mathematics, Rice University, Houston, Texas 77001.

Probability and statistics to STEVEN OREY, School of Mathematics, University of Minnesota, Minneapolis, MN 55455.

## OTHER JOURNALS

Current Mathematical Publications, issued biweekly, contains a subject-classified index of papers and books being published currently in mathematics.

Mathematical Reviews is a monthly journal devoted to abstracts and reviews of the current mathematical literature of the world. Each volume consists of six regular issues plus an index issue. Abstracts and reviews are grouped under subject headings.

Notices of the American Mathematical Society, published eight times a year, announces the programs of the meetings of the Society. The NOTICES carries the abstracts of all contributed papers presented at the meetings of the Society and publishes news items of interest to mathematical scientists. All communications should be addressed to the Editor, American Mathematical Society, P. O. Box 6248, Providence, RI 02940. News items and insertions for each issue must be in the hands of the editor on or before the deadline for the abstracts for the papers to be presented in the meetings announced in that issue. These deadlines are published regularly on the inside front cover.

# BULLETIN (New Series) of the American Mathematical Society 

## MANUSCRIPT, PROOF AND COPYING INFORMATION

## SUBMISSION OF MANUSCRIPT

Articles submitted for publication should be typewritten, double spaced, and no more than 11 ( $8 \frac{1}{2}{ }^{\prime \prime} \times 11^{\prime \prime}$ ) pages long. The Manual for Authors, available from the Society, should be consulted for symbols and style conventions. Authors should take the greatest possible care in preparing the original manuscript. Hand drawn symbols are satisfactory, if clearly done; directions to the printer should be included where necessary on a separate sheet.
For Research-Expository Articles and Research Announcements, the first footnote should include subject classification numbers representing the primary and secondary subjects of the article. The AMS (MOS) Subject Classification Scheme (1970) can be found in the December index volumes of Mathematical Reviews. Be sure to use the AMS (MOS) subject classification numbers and not the MR subject classification numbers that will appear in the same volume.

## COPYRIGHT TRANSFER AGREEMENT

The signing of a Copyright Transfer Agreement is a requirement of publication in the BULLETIN. A copy of the agreement is sent to authors upon receipt of a manuscript in the Providence Office of the Society; in case of joint authors, copies are sent to the author who is designated to receive galley proof. Authors are urged to return the form immediately to prevent delays in processing and publishing of the manuscript. The 1978 edition of the Manual for Authors has a description of Society policy concerning copyright and a copy of the agreement.

## PUBLICATION CHARGES

Research Announcements carry a page charge of $\$ 40.00$ per page to help defray the cost of publication. This amount is charged to the institution or to a contract supporting the research reported in the published paper. The publication charge policy of the United States Federal Council for Science and Technology (FCST) is reported on page 112 of the February, 1975 issue of the NOTICES of the American Mathematical Society. In no case is the author personally responsible for paying the page charge, nor is acceptance of the author's paper for publication dependent upon payment of the page charge.

## REPRINTS AND ADDRESS CHANGES

Any inquiries concerning a paper which has been accepted for publication, including information regarding reprints or changes of address for mailing proof, should be sent directly to the Editorial Department, American Mathematical Society, P. O. Box 6248, Providence, Rhode Island 02940.

## GALLEY PROOF

When a paper with more than one author has been accepted for publication, only one set of galley proof will be sent. Joint authors should, therefore, indicate which of them should receive galley proof in the event that the manuscript is accepted for publication.

## COPYING AND REPRINTING

Individual readers of this publication, and nonprofit libraries acting for them are permitted to make fair use of the material, such as to copy an article for use in teaching or research. Permission is granted to quote brief passages from this publication in reviews provided the customary acknowledgement of the source is given.
Republication, systematic copying, or multiple reproduction of any material in this publication (including abstracts) is permitted only under license from the American Mathematical Society. Requests for such permission should be addressed to the Executive Director, American Mathematical Society, Box 6248, Providence, Rhode Island 02940.
The appearance of the code on the first page of an article in this journal indicates the copyright owner's consent for copying beyond that permitted by Sections 107 or 108 of the U. S. Copyright Law, provided that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. Operations Center, P. O. Box 765, Schenectady, New York 12301. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.

EDITORIAL BOARD FOR RESEARCH-EXPOSITORY ARTICLES

Lipman Bers
Felix E. Browder,
Chairman
Paul J. Cohen
Morton L. Curtis
EDITORIAL BOARD FOR RESEARCH ANNOUNCEMENTS
Irving Kaplansky
Robert P. Langlands
Richard K. Lashof
Hugh P. McKean, Jr.
Hugh L. Montgomery

Frederick W. Gehring
Donald S. Ornstein
James B. Serrin
Stephen Smale
John T. Tate

Cathleen S. Morawetz
David Mumford
Gian-Carlo Rota
I. M. Singer, Chairman

Elias M. Stein
RESEARCH - EXPOSITORY PAPERS
Nonconvex minimization problems by Ivar Ekeland ..... 443
Invariants of finite groups and their applications to combinatorics by Richard P. Stanley ..... 475
BOOK REVIEWS
Algebraic geometry I: Complex projective varieties by David Mumford Reviewed by Robin Hartshorne ..... 513
Semisimple Lie algebras by Morikuni Goto and Frank D. Grosshans Reviewed by J. E. Humphreys ..... 515
Closed graph theorems and webbed spaces by M. De Wilde Reviewed by Taqdir Husain ..... 518
Solutions of ill posed problems by $N$. Tikhonov and V. Y. Arsenin Reviewed by Howard A. Levine ..... 521
Catastrophe theory and its applications by Tim Postor and Ian Stewart Reviewed by Martin Golubitsky ..... 524
Innovation processes by Yuriy A. Rozanov - Reviewed by Steven Orey ..... 532
Equations of mixed type by M. M. Smirnov - Reviewed by Murray H. Protter ..... 534
The Bochner integral by Jan Mikusiński - Reviewed by Joseph Diestel ..... 538
A course in mathematical logic by Yu. I. Manin - Reviewed by J. R. Shoenfield ..... 539
Saks spaces and applications to functional analysis by J. B. Cooper Reviewed by Zbigniew Semadeni ..... 541
Geometric asymptotics by Victor Guillemin and Shlomo Sternberg; Symplectic geometry and Fourier analysis by Nolan R. Wallach - Reviewed by Jerrold E. Marsden and Alan Weinstein ..... 545
Algebraic geometry by Robin Hartshorne - Reviewed by Stephen S. Shatz ..... 553
Infinitary combinatorics and the axiom of determinateness by Eugene M. Kleinberg Reviewed by John Steel ..... 560
Several complex variables by H. Grauert and K. Fritzsche
Reviewed by Bernard Shiffman ..... 563
Algebraic methods in the global theory of complex spaces by Constantin Bănică and Octavian Stănăsilă - Reviewed by Robin Hartshorne ..... 566
Lectures on closed geodesics by Wilhelm Klingenberg - Reviewed by Leon Green ..... 568
Optimal stopping rules by A. N. Shiryayev - Reviewed by D. O. Siegmund. ..... 570
RESEARCH ANNOUNCEMENTS
Finiteness theorems for polycyclic groups by F. J. Grunewald, P. F. Pickel and D. Segal ..... 575
Removable singularities in Yang-Mills fields by Karen Keskulla Uhlenbeck ..... 579
Traversal times of Markov processes by R. V. Chacon and Benton Jamison ..... 583
Automorphic forms and singularities of complex surfaces by Philip Wagreich ..... 585
A higher dimension generalization of the Sine-Gordon equation and its Bäcklund transformation by Keti Tenenblat and Chuu-Lian Terng ..... 589

