CAALENDAR OF AMS MEETINGS

THIS CALENDAR lists all meetings which have been approved by the Council prior to the date this issue of the Notices was sent to press. The summer and annual meetings are joint meetings of the Mathematical Association of America and the American Mathematical Society. The meeting dates which fall rather far in the future are subject to change; this is particularly true of meetings to which no numbers have yet been assigned. Programs of the meetings will appear in the issues indicated below. First and second announcements of the meetings will have appeared in earlier issues.

ABSTRACTS OF PAPERS presented at a meeting of the Society are published in the journal Abstracts of papers presented to the American Mathematical Society in the issue corresponding to that of the Notices which contains the program of the meeting. Abstracts should be submitted on special forms which are available in many departments of mathematics and from the office of the Society in Providence. Abstracts of papers to be presented at the meeting must be received at the headquarters of the Society in Providence, Rhode Island, on or before the deadline given below for the meeting. Note that the deadline for abstracts submitted for consideration for presentation at special sessions is usually three weeks earlier than that specified below. For additional information consult the meeting announcement and the list of organizers of special sessions.

<table>
<thead>
<tr>
<th>MEETING NUMBER</th>
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<th>PLACE</th>
<th>ABSTRACT DEADLINE ISSUE</th>
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<tr>
<td>780</td>
<td>October 18-19, 1980</td>
<td>Providence, Rhode Island</td>
<td>AUGUST 21 October</td>
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<td>781</td>
<td>October 31-November 1, 1980</td>
<td>Kenosha, Wisconsin</td>
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<td>782</td>
<td>November 14-15, 1980</td>
<td>Knoxville, Tennessee</td>
<td>SEPTEMBER 19 November</td>
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<tr>
<td>April 23-25, 1981</td>
<td>Reno, Nevada</td>
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<tr>
<td>May 15-16, 1981</td>
<td>Pittsburgh, Pennsylvania</td>
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<tr>
<td>January 13-17, 1982 (88th Annual Meeting)</td>
<td>Cincinnati, Ohio</td>
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Notices DEADLINES

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<tr>
<th>ISSUE</th>
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<tr>
<td>October 1980</td>
<td>August 25</td>
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<td>November 1980</td>
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<td>September 30</td>
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<td>January 1981</td>
<td>October 22</td>
<td>November 14</td>
</tr>
</tbody>
</table>

Deadlines for announcements intended for the Special Meetings section are the same as for News.

Other Events Sponsored by the Society

1980

August 16-17  AMS Short Course: Computer Algebra—Symbolic  This Issue, p. 395
Mathematical Computation, University of Michigan, Ann Arbor
ANN ARBOR MEETINGS, August 18-22, 1980

Program for the Summer Meeting

The August 1980 Joint Mathematics Meetings, including the 84th summer meeting of the AMS, the 60th summer meeting of the Mathematical Association of America, the 1980 annual meeting of the Institute of Mathematical Statistics, and the 1980 annual meeting of Pi Mu Epsilon, will be held August 18-22, 1980, at the University of Michigan, Ann Arbor.

The members of the Local Arrangements Committee are Paul T. Bateman (ex officio), Morton Brown, Frederick W. Gehring, George E. Hay, Marshall D. Hestenes, Melvin Hochster, Fred Hoppe, Paul Howard, Phillip S. Jones, Wilfred Kaplan, Wilfred M. Kincaid, William J. LeVeque (ex officio), Judith Q. Longyear, M.S. Ramanujan, Ethel Rathbun, Marjorie D. Reade, Maxwell O. Reade (chairman), David P. Roselle (ex officio), Joseph L. Ullman, and James G. Wendel (publicity director).

WHERE TO FIND IT

SUMMER MEETING OF AMS
Colloquium Lectures, Steele Prizes, Invited Addresses, Special Sessions, Contributed Papers, Council and Business Meetings, Committee on Employment and Educational Policy, Short Course

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MISCELLANEOUS INFORMATION

Camping, Athletic Facilities, Book Stores, Child Care, Crib Rental, Entertainment, Libraries, Local Information, Medical Services, Parking, Travel, Weather, Area Map

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84TH SUMMER MEETING OF THE AMS
August 19-22, 1980

Colloquium Lectures

There will be one series of four Colloquium Lectures presented by Julia B. Robinson of the University of California, Berkeley. The title of the lecture series is "Between logic and arithmetic." The lectures will be given at 1:00 p.m. on Tuesday, August 19, and at 8:45 a.m. on Wednesday, Thursday, and Friday, August 20-22. The topics of the four lectures are: Fifty years after Gödel's discoveries; Diophantine equations; Definability in fields; and Nonstandard models of arithmetic.

Prize Session

The 1980 LeRoy P. Steele prizes and the Norbert Wiener Prize in Applied Mathematics will be awarded at a session at 4:00 p.m. on Thursday, August 21.

Invited Addresses

By invitation of the Program Committee, there will be eight invited one-hour addresses. The speakers, their titles, and times of the talks are as follows:

- DAN BURGHELEA, Ohio State University, Whitehead torsion old and new and its relationship with the geometric topology, 11:15 a.m. Thursday.
- CIPRIAN FOIAS, Indiana University, The norm preserving lifting of interwining of vectors and its applications, 11:15 a.m. Friday.
- HOWARD GARLAND, Yale University, The arithmetic theory of loop groups, 10:00 a.m. Thursday.
- HEINI HALBERSTAM, University of Nottingham, England, and University of Illinois at Urbana-Champaign, Sieves and combinatorial inequalities: From Eratosthenes to Chen, 10:00 a.m. Friday.
- ROBERT P. KAUFMAN, University of Illinois at Urbana-Champaign, Differential equations in the complex domain, 11:15 a.m. Wednesday.
- JACK C. KIEFER, University of California, Berkeley, Optimum combinatorial designs, 1:00 p.m. Thursday.
- MICHAEL E. O'NAN, Rutgers University, A survey of sporadic simple groups, 3:45 p.m. Tuesday.
- J. H. VAN LINT, Technical University of Eindhoven, Netherlands, Good codes, 10:00 a.m. Wednesday.

All of these hour talks will be given in the Rackham Lecture Hall. Professor Kiefer's talk is jointly sponsored by the Institute of Mathematical Statistics.

Special Sessions

By invitation of the same committee there will be thirteen special sessions of selected twenty-minute papers.

- Analytic number theory, to be held Wednesday
American Mathematical Society Short Course Series

Computer Algebra—Symbolic Mathematical Computation

August 16-17, 1980

The American Mathematical Society, in conjunction with its eighty-fourth summer meeting, will present a one and one-half day short course entitled Computer Algebra — Symbolic Mathematical Computation on Saturday and Sunday, August 16 and 17, 1980, on the University of Michigan campus in Ann Arbor. The program is under the direction of David Y. Y. Yun, Manager of Computer Algebra, Mathematical Sciences Department, IBM Watson Research Center.

The course will attempt to establish the scope and the significant results as well as the potentials and limitations of computerizing symbolic and algebraic calculations. Unlike numerical analysis, the emphasis in computer algebra is on the determination of algorithmic solvability and the realization of computational processes for obtaining exact, symbolic, closed-form solutions to mathematical problems. A comprehensive overview together with in-depth presentations of selected theoretical results and algorithms of computer algebra will be given. Currently, feasible machine computations range from manipulation of symbols and simplification of formal expressions, through closed-form summation and decision procedures for integration and differential equations, to definitions of and computations in abstract algebraic domains, such as groups, rings, and fields. Such symbolic and algebraic modes of solving problems are most familiar to mathematicians, for whom computations beyond simple manipulative algebra are often useful or even necessary to test conjectures, to generate examples of or counter-examples to theories, or to gain insight by applying trial transformations. Many of these capabilities have been collected in interactive computer systems which provide convenient user interfaces to these computational tools. Some of the available computer algebra systems include the micro-processor based mu-MATH, the portable and versatile ALTRAN, REDUCE, and SAC, and the comprehensive MACSYMA and SCRATCHPAD residing on large, essentially dedicated, main-frame machines. A representative selection of these systems will be demonstrated and the participants will have the opportunity to try solving their favorite computational problems symbolically.

The course will consist of six lectures of seventy-five minutes each. The title of each lecture reflects the central theme, and one or two key subjects will be discussed in depth. Many related areas will also be covered to provide an overview of the theme topic that includes historical perspectives, surveys of existing results, mathematical and theoretical backgrounds, computational techniques and algorithms, implementational realities or empirical comparisons, and open problems for future research. Each lecture will follow from, and build on the material of, the previous ones. The titles and speakers for the six talks are:

Introduction to computer algebra — Systems and basic algorithms, Anthony C. Hearn, Chairman, Computer Science Department, University of Utah; Algebraic computations and structures, James H. Davenport, Mathematical Sciences Department, IBM Watson Research Center (also University of Cambridge); Solution of equations by constructive algebraic mappings, David Y. Y. Yun, Manager of Computer Algebra, Mathematical Sciences Department, IBM Watson Research Center; Algebraic numbers and polynomial factorization, Hale F. Trotter, Chairman, Department of Mathematics, Princeton University; Computational group theory, Charles C. Sims, Department of Mathematics, Rutgers University; Algorithms for solving differential equations in finite terms, B. F. Caviness, Department of Mathematical Sciences, Rensselaer Polytechnic Institute.

At the end of each day (approximately 4 to 5 p.m.), there will be a demonstration and hands-on systems session where participants can explore and experiment with symbolic and algebraic facilities, as well as carry on general discussions with the lecturers.

Synopses of the lectures and accompanying reading lists appeared on pages 336-338 of the June 1980 Notices. A basic knowledge of algebra and calculus together with some exposure to general (independent of any particular computer programming language) algorithmic specifications of computational processes will be presumed. Those who wish to get the most benefit from the course should consult Chapters 7 and 8 of The Design and Analysis of Computer Algorithms, by Aho, Hopcroft, and Ullman, Addison-Wesley, 1974, or Chapter 4 of The Art of Computer Programming, Vol. 2: Seminumerical Algorithms, by D. Knuth, Addison-Wesley, 1969. An overview of the current activities in computer algebra can be obtained by scanning Lecture Notes in Computer Science, No. 72: Symbolic and Algebraic Computation, E. W. Ng (editor), Springer-Verlag, 1979. The reading lists also give a variety of sources for study prior to the course.

The short course is open to all who wish to participate upon payment of the registration fee. Participants may preregister for the course until July 3, 1980, for $18; a special preregistration fee of $3 has been set for students and unemployed individuals. After the preregistration deadline, the fees will be increased to $20 and $5, respectively.

The short course was recommended by the Society’s Committee on Employment and Educational Policy, whose members are Lida K. Barrett (chairman), Arthur P. Mattuck, Donald C. Rung, Hans Schneider, Robert J. Thompson, and William P. Ziener. The short course series is under the direction of the CEEP Short Course Subcommittee, whose members are Ronald L. Graham (chairman), Robert M. McKelvey, Cathleen S. Morawetz, and Barbara L. Ososky.
morning, Thursday, and Friday, organized by BRUCE C. BERNDT of the University of Illinois at Urbana-Champaign. The speakers will be Krishnaswami Alladi, George E. Andrews, Bruce C. Berndt, David M. Bressoud, Harvey Cohn, Brian Conrey, Harold G. Diamond, Ronald J. Evans, Sidney W. Graham, James L. Hafner, Richard H. Hudson, Kevin W. J. Kadell, Marvin I. Knopp, Grigori Kolesnik, Jeffrey C. Lagarias, Gerald Myerson, L. Alayne Parson, Donald B. Redmond, Kenneth Rogers, Edith T. Stevenson, and Jeffrey D. Vaaler.

Topos theory, to be held Friday, organized by ANDREAS R. BLASS of the University of Michigan, Ann Arbor. The speakers will be Jonathan M. Beck, Peter T. Johnstone, Joachim Lambek, F. William Lawvere, L. Gaunce Lewis, jr., and Philip S. Mulry.

Current trends in nonlinear analysis, to be held Tuesday afternoon and Wednesday morning, organized by LAMBERTO CESARI of the University of Michigan, Ann Arbor. The speakers will be Melvyn S. Berger, Lamberto Cesari, Robert M. Goor, Rangachary Kannan, V. Lakshmikantham, Alan C. Lazer, Johannes C. C. Nitsche, W. V. Petryshyn, Simeon Reich, Erich H. Rothe, Jane Cronin Scanlon, Edward Silverman, and Calogero Vinti.

Stochastic analysis, to be held Tuesday afternoon, Wednesday morning, and Thursday morning, organized by PAO-LIU CHOW of Wayne State University. The speakers will be Alain Bensoussan, Albert T. Bharucha-Reid, Donald A. Dawson, Wendell H. Fleming, M. P. Heble, Hui-Hsiung Kuo, Thomas G. Kurtz, George C. Papanicolaou, Mark A. Pinsky, Daniel W. Stroock, and Michael Williams.

Mathematical methods in wave propagation, to be held Thursday and Friday, organized by DAVID L. COLTON of the University of Delaware. The speakers will be Clifford O. Bloom, David K. Cohoon, Jeffrey M. Cooper, Ronald J. DiPerna, Robert P. Gilbert, Albert E. Heins, Irwin W. Kay, Andreas Kirsch, Peter D. Lax, Walter Littman, Richard C. MacCamy, Robert F. Millar, Cathleen S. Morawetz, Alexander G. Ramm, Jeffrey B. Rauch, Victor Twersky, and Vaughan H. Weston.

Models of arithmetic, to be held Tuesday afternoon, Wednesday morning, and Thursday morning, organized by MARTIN D. DAVIS of the Courant Institute of Mathematical Sciences, New York University. The speakers will be Andreas R. Blass, Julia F. Knight, Richard J. Lipton, Angus J. MacIntyre, George H. Mills, Jan Mycielski, Mark E. Nadel, James H. Schmerl, Stephen G. Simpson, Craig A. Smoryński, and Lou van den Dries.

Codes, groups, and designs, to be held Thursday and Friday, organized by VERA S. PLESS of the University of Illinois at Chicago Circle. The speakers will be Edward F. Assmus, Jr., Eiichi Bannai, Elwyn R. Berlekamp, Kenneth P. Bogart, Robert Calderbank, Paul Camion, John H. Conway, Donald Y. Goldberg, W. Cary Huffman, Noboru Ito, Judith Q. Longyear, F. Jessie MacWilliams, H. F. Mattson, Jr., Andrew M. Odlyzko, Vera S. Pless, Chester J. Salwach, Neil J. A. Sloane, Jacobus H. Van Lint, and Harold N. Ward.

Extremal problems in combinatorial geometry, to be held Tuesday afternoon and Wednesday morning, organized by GEORGE B. PURDY of Texas A & M University. The speakers will be Fan R. K. Chung, Joel C. Gibbons, Murray S. Klamkin, William O. J. Moser, George B. Purdy, Charles Radin, Kenneth B. Stolarsky, Ernst G. Straus, and John E. Wetzel.


Mathematical symbolic manipulation on the computer, to be held Tuesday afternoon, Wednesday morning, and Thursday morning, organized by DAVID SAUNDERS of Renssalaer Polytechnic Institute. The speakers will be Gregory Butler, Bruce W. Char, George E. Collins, James Davenport, David J. Ford, Jerald J. Kovacic, Eugene M. Luks, John McKay, Robert A. Morris, Myra Jean Pelle, Maxwell A. Rosenlicht, Michael F. Singer, Hale F. Trotter, David Y. Y. Yun, and Hans J. Zassenhaus.

Applications of mathematics to anthropology and sociology, to be held Tuesday afternoon, Wednesday morning, and Thursday morning, organized by STEPHEN B. SEIDMAN of George Mason University. The speakers will be Steven D. Berkowitz, John P. Boyd, Cornelis Hoede, Charles H. Goldberg, Penelope J. Greene, Frank Harary, Jack E. Hunter, Alden S. Kleidahl, Dwight W. Read, Robert G. Reynolds, Ronald E. Rice, Stephen B. Seidman, and Stanley S. Wasserman.

Hardy spaces and harmonic analysis, to be held Thursday and Friday, organized by ALBERTO TORCHINSKY of Indiana University. The speakers will be Earl R. Berkson, Donald L. Burkholder, Eugene B. Fabes, David S. Jerison, Carlos E. Kenig, John N. McDonald, Kent G. Merryfield, Umberto Neri, Richard H. Rochberg, Donald E. Sarason, Eric T. Sawyer, David A. Stengega, Carl Sundberg, Stephen Wainger, Guido L. Weiss, and R. L. Wheeden.

Orthogonal polynomials and other extremal polynomials, to be held Tuesday afternoon, Wednesday morning, and Thursday, organized by JOSEPH L. ULLMAN of the University of Michigan, Ann Arbor. The speakers will be Richard A. Askey, James Ward Brown, Charles K. Chui, J. S. Dehesa, George Gasper, Jr., Jeffrey S. Geronimo, Mourad E. H. Ismail, Lee Lorch, Francisco Marcellán, Attila Máté, H. N. Mhaskar, Daniel S. Moak, Paul G. Nevai, Mizan Rahman, Joseph L. Ullman, and R. A. Zalik.
### TIMETABLE

**AMERICAN MATHEMATICAL SOCIETY SHORT COURSE SERIES**

**SATURDAY, August 16**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</table>
| 11:00 a.m. - 4:00 p.m. | REGISTRATION (Short Course Only)  
Outside Auditorium 4, MLB |
| 1:00 p.m. - 2:15 p.m. | Introduction to computer algebra—systems and basic algorithms  
Anthony C. Hearn |
| 2:30 p.m. - 3:45 p.m. | Algebraic computations and structures  
James H. Davenport |
| 4:00 p.m. - 5:00 p.m. | Systems demonstration and hands-on session  
1210 Chemistry |

**SUNDAY, August 17**

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<th>Time</th>
<th>Event</th>
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| 8:00 a.m. - 2:00 p.m. | REGISTRATION (Short Course Only)  
Outside Auditorium 4, MLB |
| 9:00 a.m. - 10:15 a.m. | Solution of equations by constructive algebraic mappings  
David Y. Y. Yun |
| 10:30 a.m. - 11:45 a.m. | Algebraic numbers and polynomial factorization  
Hale F. Trotter |
| 1:00 p.m. - 2:15 p.m. | Computational group theory  
Charles C. Sims |
| 2:30 p.m. - 3:45 p.m. | Algorithms for solving differential equations in finite terms  
B. F. Caviness |
| 4:00 p.m. - 5:00 p.m. | Hands-on session and general discussion  
1210 Chemistry |

### JOINT MATHEMATICS MEETINGS

**SUNDAY, August 17**

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</table>
| 2:00 p.m. - 8:00 p.m. | REGISTRATION  
Ballroom, Michigan League |

**MONDAY, August 18**

**American Mathematical Society**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</table>
| 8:00 a.m. - 4:30 p.m. | REGISTRATION  
Ballroom, Michigan League |

**Other Organizations**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</table>
| 8:00 a.m. - 4:30 p.m. | AMS BOOK SALE  
Ballroom, Michigan League |
| 9:00 a.m. - 9:10 a.m. | Mathematical Association of America  
WELCOME ADDRESS  
Rackham Lecture Hall |
| 9:10 a.m. - 10:00 a.m. | MAA - THE EARLE RAYMOND HEDRICK LECTURES: Lecture I  
Partitions: Elementary elegance  
George E. Andrews  
Rackham Lecture Hall |
| 10:00 a.m. - 11:00 a.m. | Institute of Mathematical Statistics  
SPECIAL INVITED PAPER I  
Self-similarity and random fractals  
Benoit Mandelbrot  
Auditorium A, AH |
| 10:10 a.m. - 11:00 a.m. | MAA - INVITED ADDRESS  
Mathematicians, cryptography and computers in the Second World War  
Peter J. Hilton  
Rackham Lecture Hall |
Committee on the Agenda for Business Meetings

The Society has a Committee on the Agenda for Business Meetings. The purpose is to make Business Meetings orderly and effective. The committee does not have legal or administrative power. It is intended that the committee consider what may be called “quasi-political” motions. The committee has several possible courses of action on a proposed motion, including but not restricted to:

(a) doing nothing;
(b) conferring with supporters and opponents to arrive at a mutually accepted amended version to be circulated in advance of the meeting;
(c) recommending and planning a format for debate to suggest to a Business Meeting;
(d) recommending referral to a committee;
(e) recommending debate followed by referral to a committee.

There is no mechanism that requires automatic submission of a motion to the committee. However, if a motion has not been submitted through the committee, it may be thought reasonable by a Business Meeting to refer it rather than to act on it without benefit of the advice of the committee.

The committee consists of Marion B. Pour-El, David A. Sanchez, Barnet M. Weinstock, and Guido L. Weiss, with the secretary as chairman.

In order that a motion for the Business Meeting of August 21, 1980, receive the service to be offered by the committee in the most effective manner, it should have been in the hands of the secretary by July 21, 1980.

Everett Pitcher, Secretary

Contributed Papers

There will be sessions for contributed ten-minute papers on Tuesday afternoon, Wednesday morning, Thursday morning, Thursday afternoon, Friday morning, and Friday afternoon. The deadline for abstracts was June 3, 1980.

Audio-Visual Equipment

Rooms where special sessions and contributed-paper sessions will be held will be equipped with an overhead projector, screen, and blackboard.

Committee on Employment and Educational Policy (CEEP)

The Society's Committee on Employment and Educational Policy (CEEP) will have an open session at 7:30 p.m. on Monday, August 18, where a preliminary report on the 1980 AMS Nonacademic Salary Survey will be presented by Robert J. Thompson of Sandia National Laboratories, Albuquerque.

Council Meeting

The Council of the Society will meet at 4:00 p.m. on Tuesday, August 19, in the Vandenberg Room of the Michigan League.

Business Meeting

The Business Meeting of the Society will take place at 5:00 p.m. on Thursday, August 21, in the Rackham Lecture Hall. The secretary notes the following resolution of the Council: Each person who attends a Business Meeting of the Society shall be willing and able to identify himself as a member of the Society. In further explanation, it is noted that each person who is to vote at a meeting is thereby identifying himself as and claiming to be a member of the American Mathematical Society. For additional information on the Business Meeting, please refer to the box titled Committee on the Agenda for Business Meetings.

ACTIVITIES OF OTHER ORGANIZATIONS

The Mathematical Association of America (MAA) will hold its 60th summer meeting on August 18-20, Monday-Wednesday. The Business Meeting of the MAA will take place at 10:00 a.m. on Tuesday, August 19, at which the Carl B. Allendoerfer, Lester R. Ford, and George Pólya awards will be presented. A series of three Earle Raymond Hedrick Lectures will be given by George E. Andrews of Pennsylvania State University. The title of the lecture series is Partitions. The topics of the three lectures are: Elementary elegance, Applications, and Ramanujan's "lost" notebook.

Information regarding a minicourse to be offered by the MAA in Ann Arbor is contained in the box on page 400.

There will be a dinner at 7:00 p.m. on Tuesday, August 19, in the Michigan League for those who have been members of the MAA for twenty-five years or more. Similar dinners have been held at each of the last several summer meetings and have proved to be pleasant occasions. Twenty-five-year members of the MAA who have reserved tickets may pick them up at the Transparencies section of the registration desk, and should do so prior to 4:30 p.m. on Tuesday. The cost of each ticket is $12, including sales tax and gratuity. Spouses are invited.

For a more detailed listing of the activities of the MAA, see the Timetable.

The Institute of Mathematical Statistics (IMS) will hold its 1980 annual meeting on August 18-21, Monday-Thursday. The 1980 Wald Lectures will be given by Peter J. Bickel, University of California, Berkeley, on Topics in robustness and adaptation. The three lectures in this series will be given at
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<tr>
<th>Time</th>
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<th>Other Organizations</th>
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<tbody>
<tr>
<td>11:10 a.m. - noon</td>
<td>MAA - INVITED ADDRESS</td>
<td>Some ideas in nonlinear analysis</td>
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<tr>
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<td>Ivar Stakgold</td>
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<td>Rackham Lecture Hall</td>
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<tr>
<td>11:15 a.m. - 12:15 p.m.</td>
<td>IMS - SPECIAL INVITED PAPER II</td>
<td>Sequential tests of statistical hypotheses</td>
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<td>Tze L. Lai</td>
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<td>Auditorium 3, MLB</td>
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<tr>
<td>12:45 p.m. - 1:15 p.m.</td>
<td>MAA - Films on mathematics and art</td>
<td>Michaella Emmer</td>
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<td>Rackham Lecture Hall</td>
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<td>1:00 p.m. - 5:00 p.m.</td>
<td>EXHIBITS</td>
<td>Ballroom, Michigan League</td>
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<tr>
<td>1:20 p.m. - 2:10 p.m.</td>
<td>MAA - THE EARLE RAYMOND</td>
<td>HEDRICK LECTURES: Lecture II</td>
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<td>Partitions: Applications</td>
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<td>George E. Andrews</td>
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<td>Rackham Lecture Hall</td>
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<tr>
<td>2:15 p.m. - 3:15 p.m.</td>
<td>IMS - WALD LECTURE I</td>
<td>Topics in robustness and adaptation</td>
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<td>Peter J. Bickel</td>
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<td>Auditorium A, AH</td>
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<tr>
<td>3:20 p.m. - 4:10 p.m.</td>
<td>MAA - INVITED ADDRESS</td>
<td>Pensively penetrating Penrose’s pentapieces</td>
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<td>John H. Conway</td>
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<td>Rackham Lecture Hall</td>
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<tr>
<td>3:30 p.m. - 5:15 p.m.</td>
<td>IMS - INVITED SESSION I</td>
<td>Stochastic differential equations</td>
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<td>Mark Pinsky (chairman)</td>
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<td>Auditorium A, AH</td>
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<td>Regularity estimates on the marginal</td>
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<td>distributions of certain processes</td>
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<td>Daniel Stroock</td>
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<td>3:30 p.m.</td>
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<td>4:05 p.m.</td>
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<td>4:40 p.m.</td>
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<tr>
<td>3:30 p.m. - 5:30 p.m.</td>
<td>IMS - CONTRIBUTED PAPER SESSION I</td>
<td>Auditorium B, AH</td>
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<tr>
<td>4:15 p.m. - 5:30 p.m.</td>
<td>MAA - PANEL DISCUSSION:</td>
<td>Employment opportunities for non-Ph. D. mathematicians</td>
</tr>
<tr>
<td></td>
<td>Machine-grading</td>
<td>David W. Ballew (moderator)</td>
</tr>
<tr>
<td></td>
<td>of college mathematics courses</td>
<td>Rackham Lecture Hall</td>
</tr>
<tr>
<td></td>
<td>Opportunities in industry</td>
<td>Donald W. Bushaw</td>
</tr>
<tr>
<td></td>
<td>Opportunities in secondary teaching</td>
<td>Arthur Coxford</td>
</tr>
<tr>
<td></td>
<td>Opportunities in computer science</td>
<td>Orrin E. Taubee</td>
</tr>
<tr>
<td>4:15 p.m. - 5:30 p.m.</td>
<td>MAA - MINICOURSE on teaching</td>
<td>calculus using infinitesimals</td>
</tr>
<tr>
<td></td>
<td>calculus using infinitesimals</td>
<td>Frank A. Wattenberg</td>
</tr>
<tr>
<td></td>
<td>calculus using infinitesimals</td>
<td>Lecture Room 1, MLB</td>
</tr>
<tr>
<td>7:00 p.m. - 9:00 p.m.</td>
<td>MAA - OPEN MEETING</td>
<td>CUPM Panel on the Calculus Sequence</td>
</tr>
<tr>
<td>7:00 p.m. - 9:00 p.m.</td>
<td></td>
<td>B-109, MLB</td>
</tr>
</tbody>
</table>

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On Monday and Tuesday evenings (August 18-19), there will be a minicourse on Teaching calculus using infinitesimals. Over the past dozen years a number of instructors have taught such a course to a variety of students from the high school to university level. A few of these courses have been honor sections, but most have been mainstream calculus sections. This minicourse will report on both the content of these courses and the results in terms of student perception of the course. There will be two sample lectures and problem sessions which illustrate the content and pedagogy of calculus with infinitesimals, a short lecture on the mathematical underpinning of infinitesimals, and a panel discussion by instructors who have taught such courses. The minicourse will be conducted by FRANK A. WATTENBERG of the University of Wisconsin, Madison.

Enrollment is limited to thirty participants, and there is a registration fee of $15. If more than thirty persons preregister for the minicourse, requests will be processed on a first-come, first-served basis, and checks will be returned to those not enrolled. The minicourse is open only to persons who have registered for the Joint Mathematics Meetings.

Since last-minute openings may occur, interested parties should inquire at the meeting registration desk.

2:15 p.m. on Monday-Wednesday, August 18-20. Special invited papers will be given by Benoît Mandelbrot, Self-similarity and random fractals; Tze L. Lai, Sequential tests of statistical hypotheses, and Rudolph J. Beran, Differentiable functionals and robustness: The nonindependent and identically distributed case. The IMS Business Meeting will take place at 5:30 p.m. on Tuesday, August 19. For a more detailed listing of the activities of the IMS, please see the Timetable.

Pi Mu Epsilon (IIME) will hold its annual meeting on August 19-20, Tuesday-Wednesday. The J. Sutherland Frame Lecture will be given by Richard A. Askey at 8:30 p.m. on Tuesday, August 19. Professor Askey's title is Ramanujan and some extensions of the Gamma and Beta functions.

The Association for Women in Mathematics (AWM) will present a symposium at 3:00 p.m. on Wednesday, August 20, about Anna Johnson Pell Wheeler, the first woman lecturer in the AMS Colloquium Series. The AWM Open Membership Meeting will take place at 4:00 p.m. on Wednesday, August 20.

The Mathematicians Action Group (MAG) will sponsor a panel discussion on Democracy in the AMS? at 8:00 p.m. on Monday, August 18. The panel will be followed by the MAG Business Meeting at 9:00 p.m.

OTHER EVENTS OF INTEREST

Summer List of Applicants. The AMS-MAA-SIAM Committee on Employment Opportunities, which is charged with operation of the Employment Register and which oversees publication of Employment Information in the Mathematical Sciences, will publish a summer list of applicants prior to the Ann Arbor meeting in August 1980. Copies of the 1980 summer list will be available at the registration desk for $1. Following the meeting, they may be purchased from the Providence office for $1. The list should prove useful to employers who have last minute openings, later in the summer or in the fall.

Instead of an Employment Register at the summer Meeting in Ann Arbor, there will be an opportunity for posting of both applicant and employer résumé forms in or near the main meeting registration area. No provisions will be made for interviews; arrangements will be the responsibility of the employer and the applicant. Messages may be left in the mail and message box located in the registration area. There will be no special room set aside for interviews.

Special applicant and employer forms will be available at the registration desk for both applicants and employers who wish to post a résumé.

Exhibits. The book and educational media exhibits will be located in the Ballroom of the Michigan League, and will be open from 1:00 p.m. to 5:00 p.m. on Monday, August 18; and from 8:30 a.m. to 4:30 p.m. on Tuesday and Wednesday, August 19-20.

Book Sales. Books published by the AMS and MAA will be sold for cash prices somewhat below the usual prices when these same books are sold by mail. The book sales will be located in the Ballroom of the Michigan League, and will be open from 8:00 a.m. to 4:30 p.m., Monday August 18, and 8:30 a.m. to 4:30 p.m., Tuesday and Wednesday, August 19-20.

Second-hand Book and Journal Exchange. It has been proposed that the AMS determine whether there is an interest in a Second-Hand Book Exchange at the annual and summer meetings. The exchange will be tested on a small scale at the Ann Arbor meeting.

At the AMS Book Sale tables in the exhibit area (the same room where registration will take place)
## TIMETABLE

### MONDAY, August 18

<table>
<thead>
<tr>
<th>Time</th>
<th>Events</th>
<th>Other Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 p.m. - 10:00 p.m.</td>
<td><strong>Pi Mu Epsilon - RECEPTION</strong>&lt;br&gt;Concourse Lounge, Markley Hall</td>
<td></td>
</tr>
<tr>
<td>7:00 p.m. - 10:00 p.m.</td>
<td><strong>IMS - COUNCIL MEETING</strong>&lt;br&gt;Kalamazoo Room, Michigan League</td>
<td></td>
</tr>
<tr>
<td>7:30 p.m. - 9:30 p.m.</td>
<td><strong>Committee on Employment and Educational Policy - OPEN SESSION</strong>&lt;br&gt;on 1980 AMS Nonacademic salary survey&lt;br&gt;Robert J. Thompson&lt;br&gt;Rackham Lecture Hall</td>
<td></td>
</tr>
<tr>
<td>7:30 p.m. - 9:30 p.m.</td>
<td><strong>MAA - Section Officers Meeting</strong>&lt;br&gt;Vandenberg Room, Michigan League</td>
<td></td>
</tr>
<tr>
<td>7:30 p.m.</td>
<td><strong>MAA - Introduction to the use of computer generated graphics in undergraduate mathematics education</strong>&lt;br&gt;Gerald J. Porter&lt;br&gt;1210 Chemistry</td>
<td></td>
</tr>
<tr>
<td>8:00 p.m. - 9:00 p.m.</td>
<td><strong>Mathematicians Action Group</strong>&lt;br&gt;PANEL DISCUSSION: Democracy in the AMS?&lt;br&gt;Auditorium 4, MLB</td>
<td></td>
</tr>
<tr>
<td>9:00 p.m. - 10:00 p.m.</td>
<td><strong>MAG - BUSINESS MEETING</strong>&lt;br&gt;Auditorium 4, MLB</td>
<td></td>
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</table>

### TUESDAY, August 19

<table>
<thead>
<tr>
<th>Time</th>
<th>Events</th>
<th>Other Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td><strong>REGISTRATION</strong>&lt;br&gt;Ballroom, Michigan League&lt;br&gt;<strong>EXHIBITS</strong>&lt;br&gt;Ballroom, Michigan League</td>
<td></td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td><strong>AMS BOOK SALE</strong>&lt;br&gt;Ballroom, Michigan League</td>
<td></td>
</tr>
<tr>
<td>9:00 a.m. - 9:50 a.m.</td>
<td><strong>MAA BOOK SALE</strong>&lt;br&gt;Ballroom, Michigan League</td>
<td></td>
</tr>
<tr>
<td>10:00 a.m. - 10:50 a.m.</td>
<td><strong>MAA - THE EARLE RAYMOND HEDRICK LECTURES: Lecture III</strong>&lt;br&gt;Partitions: Ramanujan's &quot;lost&quot; notebook&lt;br&gt;George E. Andrews&lt;br&gt;Rackham Lecture Hall</td>
<td></td>
</tr>
<tr>
<td>10:00 a.m. - 12:20 p.m.</td>
<td><strong>MAA - BUSINESS MEETING</strong>&lt;br&gt;Rackham Lecture Hall</td>
<td></td>
</tr>
<tr>
<td>10:00 a.m. - noon</td>
<td><strong>IMS - INVITED SESSION II</strong>&lt;br&gt;Statistical theory for orientation data&lt;br&gt;Geoffrey S. Watson (chairman)&lt;br&gt;Auditorium A, AH</td>
<td></td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Motivation, theory and techniques for orientation data&lt;br&gt;Geoffrey S. Watson</td>
<td></td>
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<tr>
<td>10:35 a.m.</td>
<td>Some proper ballistic properties of the von Mises-Fisher distribution&lt;br&gt;John Kent</td>
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<tr>
<td>11:10 a.m.</td>
<td>Exponential models for directional data&lt;br&gt;Rudolph J. Beran</td>
<td></td>
</tr>
<tr>
<td>11:45 a.m.</td>
<td>Nonstandard uses of directional methods&lt;br&gt;M. A. Stephens</td>
<td></td>
</tr>
<tr>
<td>10:00 a.m. - noon</td>
<td><strong>IMS - CONTRIBUTED PAPER SESSION II</strong>&lt;br&gt;Auditorium B, AH</td>
<td></td>
</tr>
<tr>
<td>11:00 a.m. - 11:50 a.m.</td>
<td><strong>MAA - INVITED ADDRESS</strong>&lt;br&gt;Building algebraic models&lt;br&gt;Georgia M. Benkart&lt;br&gt;Rackham Lecture Hall</td>
<td></td>
</tr>
<tr>
<td>11:00 a.m. - 11:50 a.m.</td>
<td><strong>MAA - INVITED ADDRESS</strong>&lt;br&gt;Microcomputers in a two-year college mathematics class&lt;br&gt;John S. Koestoff&lt;br&gt;Auditorium 3, MLB</td>
<td></td>
</tr>
<tr>
<td>noon - 1:00 p.m.</td>
<td><strong>IMS - Caucus of Women in Statistics</strong>&lt;br&gt;Conference Rooms 4 &amp; 5, Michigan League&lt;br&gt;IMS - Caucus of Women in Statistics</td>
<td></td>
</tr>
<tr>
<td>noon - 1:00 p.m.</td>
<td><strong>IIME - COUNCIL LUNCHEON</strong>&lt;br&gt;Conference Rooms 4 &amp; 5, Michigan League</td>
<td></td>
</tr>
</tbody>
</table>
THE UNIVERSITY OF MICHIGAN

Ann Arbor

CENTRAL CAMPUS

1 Administration Building
2 Afro-American and African Studies Center
3 Alumni Memorial Hall (Museum of Art)
4 James B. Angell Hall
5 Angell Auditorium Unit
6 Architecture and Design Building
7 Betty Barbour House
8 Margaret Bell Pool
9 Burton Memorial Tower
10 Business Administration Building
11 Business Administration Assembly Hall
12 Business Administration Library
13 Central Campus Recreation Building
14 Central Energy Plant
15 Chemistry Building
16 Church St. Parking Structure
17 William L. Clements Library of Americans
18 Continuing Education of Women
19 John Cook Residence
20 Martha Cook Building
21 Couzens Hall
22 Samuel Trask Dana Natural Resources Building
23 Dance Building

24 David M. Dennison Physics and Astronomy Building
25 School of Dentistry Building
26 East Engineering Building
27 East Quadrangle (Residential College)
28 Economics Building
29 School of Education Building
30 Extension Service Building
31 Fletcher St. Parking Structure
32 Henry S. Frieze Building
33 Harlan Hatcher Graduate Library
34 Hatcher Library
35 Haven Hall
36 Health Service Building
37 Hill Auditorium
38 Hill St. Parking Structure
39 Institute of Human Adjustment Counseling Division
40 Hutchins Hall
41 International Center
42 Kellogg Foundation Institute
43 Kelsey Museum of Archaeology
44 Key Office
45 Edward Henry Kraus Natural Science Building
46 Lane Hall
47 Law Library (Legal Research Building)
48 Law Quadrangle

49 Lawyers Club
50 Literature, Science, and the Arts Building
51 Clarence C. Little Science Building
52 Alice Crocker Lloyd Hall (Pilot Program)
53 Mary Markley Hall
54 Mason Hall
55 Lydia Mendelssohn Theatre
56 Michigan League
57 Cambridge House (Michigan Union)
58 Modern Language Building
59 Mosher-Jordan Hall
60 Museums Annex
61 Neurosciences Building
62 Helen Newberry Residence
63 North Hall
64 North University Building
65 Nursing Annex I
66 Observatory
67 Parking and Publications Building
68 Paton Accounting Center
69 Perry Building
70 Project Outreach
71 College of Pharmacy Building

72 University Hospital
73 Plant Service Building
74 Madeline Found House
75 Power Center for the Performing Arts
76 President's Residence
77 Psychological Clinic
78 Rackham Building
79 Harrison M. Randall Laboratory
80 Alexander G. Ruthven Museums Building, (Anthropology Paleontology, Zoology, and Exhibit Museums)
81 Institute for Social Research
82 Psychological Clinic
83 Margaret Bell Pool
84 University Herbarium
85 Undergraduate Library
86 University Union
87 West Engineering Building
88 West Quadrangle
89 Social Work Center Building
90 Student Publications Building
91 Tappan Hall
92 Thompson St. Parking Structure
93 University Hospital
94 Undergraduate Library
95 University Herbarium
96 University Union
97 West Engineering Building
98 West Quadrangle
99 Student Publications Building

NOTE:
Buildings numbered in circles and marked in the legend with a bold black dot • are referred to in the text.

P = PARKING LOT

305 East Medical Center Parking Structure
306 Thomas Francis Jr. School of Public Health Building
309 Hospital Personnel and Finance Building
326 Simpson Memorial Institute
333 Henry F. Vaughan Public Health Building
334 University Hospital
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
</table>
| 1:00 p.m. - 2:00 p.m. | Colloquium Lecture I  
Between logic and arithmetic: Fifty years after Gödel's discoveries  
Julia B. Robinson  
Rackham Lecture Hall |                      |
| 2:15 p.m. - 3:15 p.m. | Sessions for Contributed Papers  
Number Theory  
B-115 MLB  
Group Theory  
439 MH  
Banach Spaces  
Auditorium D, AH | IMS - Wald Lecture II  
Topics in robustness and adaptation  
Peter J. Bickel  
Auditorium A, AH |
| 2:30 p.m. - 4:50 p.m. | Special Sessions  
Models of arithmetic I  
429 MH  
Extremal Problems in Combinatorial Geometry I  
Lecture Room 1, MLB  
Univalent Functions: Recent Developments I  
Lecture Room 2, MLB  
Orthogonal Polynomials and Other Extremal Polynomials I  
35 AH  
Current Trends in Nonlinear Analysis I  
Auditorium 3, MLB  
Mathematical Symbolic Manipulation on the Computer I  
Auditorium 4, MLB  
Applications of Mathematics to Anthropology and Sociology I  
B-116 MLB | IMS - Contributed Paper Session II  
1035 AH |
| 3:00 p.m. - 5:30 p.m. | Imre - Contributed Paper Session III  
Models of Dependence and Their Application  
Murray Rosenblatt (chairman)  
Auditorium A, AH  
Development of Parameter Estimates for Free Oscillations of the Earth  
Freeman Gilbert  
Statistical Dynamics in Weather and Climate  
C. Leith  
A New Look at the Wiener-Hopf Equation and Prediction  
David Slepian | IMS - Invited Session III  
Auditorium B, AH |
| 3:30 p.m. - 5:15 p.m. | Special Session  
Stochastic Analysis I  
Auditorium C, AH  
Invited Address  
A Survey of Sporadic Simple Groups  
Michael E. O’Nan, Rackham Lecture Hall |                      |
| 4:00 p.m. - 10:00 p.m. | Council Meeting  
Vandenberg Room, Michigan League | MAA - Reception hosted by the Michigan Section of the Association  
Concourse Lounges, Markley Hall  
IMS - Business Meeting  
Auditorium A, AH |
| 5:00 p.m. - 7:00 p.m. |  | IMS - Banquet  
North Pit, Markley Hall |
notebooks will be available with lists of books on mathematics for sale or being sought. There will be separate notebooks of books for sale and books wanted with names and addresses of the owners (or seekers). The details of the transactions themselves would have to be arranged by the participants and the AMS will not accept responsibility for settling disputes if arrangements go awry.

Those who use this service at the meeting will be asked to make suggestions concerning its usefulness or improvement. If the interest is sufficient, the service will be continued at the next Annual Meeting, possibly at that time expanded to include lists from libraries seeking replacements for lost out-of-print books and lists from second-hand book dealers.

Mathematical Reviews Open House. The staff of Mathematical Reviews invites meeting participants to visit the MR offices on Thursday, August 21. The offices are located at 611 Church Street, one block east of the University of Michigan campus. In order to have an advance count of the number of visitors, participants are asked to pick up free tickets for the open house (which will cover various time periods between 2:00 p.m. and 4:00 p.m.) from the MR desk, where staff members will be available to answer questions regarding MR. This desk will be located in the registration area and staffed during the hours the registration desk is open.

INFORMATION FOR PARTICIPANTS

Registration

Meeting preregistration and registration fees only partially cover expenses of holding meetings. All who do not preregister, but attend the meetings in Ann Arbor, are expected to register during the hours listed below. The fees for registration at the meetings are:

JOINT MATHEMATICS MEETINGS

Member of AMS, IMS, MAA, IIME $30
Nonmember 40
Student/Unemployed 10
MAA MINICOURSE — All participants $15
AMS SHORT COURSE. See page 395.

There will be no extra charge for members of the families of registered participants, except that all professional mathematicians who wish to attend sessions must register independently.

Students are considered to be only those currently working toward a degree, who do not receive annual compensation totaling more than $7,000 from employment, fellowships, and scholarships.

The unemployed status refers to any person currently unemployed, actively seeking employment, and who is not a student. It is not intended to include persons who have voluntarily resigned or retired from their latest position.

Registration dates and location. The Joint Mathematics Meetings registration desk will be open during the following hours:

JOINT MATHEMATICS MEETINGS

Ballroom, Michigan League

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday, August 17</td>
<td>2:00 p.m. – 8:00 p.m.</td>
</tr>
<tr>
<td>Monday, August 18</td>
<td>8:00 a.m. – 4:30 p.m.</td>
</tr>
<tr>
<td>Tuesday, August 19</td>
<td></td>
</tr>
<tr>
<td>Wednesday, August 20</td>
<td>8:30 a.m. – 4:30 p.m.</td>
</tr>
<tr>
<td>Thursday, August 21</td>
<td></td>
</tr>
</tbody>
</table>

ASSISTANCE AND INFORMATION DESK

Lobby, Rackham Building

Friday, August 22 8:30 a.m. – 1:30 p.m.

Please note that the Joint Mathematics Meetings registration desk will not be open on Friday, August 22, and that the telephone message center will not be in operation. Other services provided at the registration desk during the meeting will also no longer be available (see section below on Registration Desk Services). There will, however, be a small desk set up in the lobby outside Rackham Lecture Hall, where local information will be available and where a staff member will provide limited assistance to participants. No registration or cash transactions will be possible at this desk.

Registration Desk Services

AMS/MAA Information. Information on the publications and activities of both organizations may be obtained at this section of the registration desk.

Audio-Visual Assistance. A member of the AMS staff will be happy to assist speakers unfamiliar with the overhead projector, or consult with speakers with special requirements.

Baggage and Coat Check. Participants may leave baggage, parcels, coats, etc., for safekeeping at the meeting registration desk during the hours it is open, provided these items are picked up before the desk closes for the day. Articles left after closing time cannot be reclaimed until the following morning.

Check Cashing. The meeting cashier will cash personal or travelers' checks up to $50, upon presentation of a meeting registration badge, and provided there is enough cash on hand.

Comments, Complaints, and Emergencies. A log for registering participants' comments or complaints about the meeting is kept at the Transparencies section of the registration desk. All participants are encouraged to use this method of helping us improve future meetings. Comments on all phases of the meeting are welcome. If you would like to receive a written reply, please furnish your name and address.

Participants with problems of an immediate nature requiring action at the meeting, should see the meeting manager, who will be happy to assist you or put you in touch with someone who can.

Mail. All mail and telegrams for persons attending the meetings should be addressed in care of
<table>
<thead>
<tr>
<th>Time</th>
<th>American Mathematical Society</th>
<th>Other Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUESDAY, August 19</td>
<td></td>
<td>MAA - BANQUET FOR 25-YEAR MEMBERS</td>
</tr>
<tr>
<td>7:00 p.m.</td>
<td></td>
<td>Hussey Room, Michigan League</td>
</tr>
<tr>
<td>7:00 p.m. - 9:00 p.m.</td>
<td></td>
<td>MAA - Minicourse on teaching calculus using infinitesimals</td>
</tr>
<tr>
<td>7:00 p.m. - 9:00 p.m.</td>
<td></td>
<td>Frank A. Wattenberg, Lecture Room 1, MLB</td>
</tr>
<tr>
<td>7:00 p.m. - 9:30 p.m.</td>
<td></td>
<td>MAA - CUPM Panel discussion for modeling and operations research</td>
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<tr>
<td>7:00 p.m.</td>
<td></td>
<td>B-118 MLB</td>
</tr>
<tr>
<td>7:00 p.m.</td>
<td></td>
<td>MAA - FILM PROGRAM</td>
</tr>
<tr>
<td>7:30 p.m. - 10:00 p.m.</td>
<td></td>
<td>Auditorium 3, MLB</td>
</tr>
<tr>
<td>8:00 p.m. - 11:00 p.m.</td>
<td></td>
<td>Hypothesis testing, inferential statistics, Part II</td>
</tr>
<tr>
<td>8:30 p.m. - 9:30 p.m.</td>
<td></td>
<td>Dragon fold</td>
</tr>
<tr>
<td>WEDNESDAY, August 20</td>
<td></td>
<td>Concerts</td>
</tr>
<tr>
<td>8:00 a.m. - 9:00 a.m.</td>
<td></td>
<td>Ramonujan and some extensions of the gamma and beta functions</td>
</tr>
<tr>
<td>8:00 a.m. - 8:45 a.m.</td>
<td></td>
<td>Richard A. Askey, Auditorium 4, MLB</td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td></td>
<td>REGISTRATION</td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td></td>
<td>EXHIBITS</td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td></td>
<td>MAA BOOK SALE</td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td></td>
<td>Ballroom, Michigan League</td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td></td>
<td>AMS BOOK SALE</td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td></td>
<td>Ballroom, Michigan League</td>
</tr>
<tr>
<td>8:45 a.m. - 9:45 a.m.</td>
<td></td>
<td>COLLOQUIUM LECTURE II</td>
</tr>
<tr>
<td>8:45 a.m. - 9:45 a.m.</td>
<td></td>
<td>Between logic and arithmetic: Diophantine equations</td>
</tr>
<tr>
<td>9:00 a.m. - 10:30 a.m.</td>
<td></td>
<td>Julia B. Robinson, Rackham Lecture Hall</td>
</tr>
<tr>
<td>9:45 a.m. - 1:00 p.m.</td>
<td></td>
<td>Special Sessions</td>
</tr>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td></td>
<td>INVITED ADDRESS</td>
</tr>
<tr>
<td>10:00 a.m. - 11:50 a.m.</td>
<td></td>
<td>Good codes, J. H. van Lint, Rackham Lecture Hall</td>
</tr>
<tr>
<td>10:00 a.m. - 12:20 p.m.</td>
<td></td>
<td>Orthogonal polynomials and other extremal polynomials I</td>
</tr>
<tr>
<td>10:00 a.m. - 11:50 a.m.</td>
<td></td>
<td>Special Sessions</td>
</tr>
<tr>
<td>10:00 a.m. - 12:20 p.m.</td>
<td></td>
<td>Special Sessions</td>
</tr>
</tbody>
</table>
Joint Mathematics Meetings, Department of Mathematics, 3220 Angell Hall, University of Michigan, Ann Arbor, Michigan 48109. Mail and telegrams so addressed may be picked up at the Joint Mathematics Meetings registration desk in the Ballroom of the Michigan League during the hours that desk is open. U.S. mail not picked up will be forwarded after the meeting to the mailing address given on the participant's registration record.

**Local Information.** This section of the desk will be staffed by members of the Local Arrangements Committee and other volunteers from the Ann Arbor mathematical community. Information and tickets for bus tours and other events and activities of interest in the area can be obtained, and several brochures on local attractions are available.

**Personal Messages.** Participants wishing to exchange messages during the meeting should use the mailbox mentioned above. Message pads and pencils are provided.

**Telephone Messages.** A telephone message center will be located in the same area to receive incoming calls for participants. The center will be open from August 17 through August 21, during the same hours as the Joint Mathematics Meetings registration desk. Messages will be taken and the name of any individual for whom a message has been received will be posted until the message has been picked up at the message center. The telephone number of the message center is 313-763-5053.

Participants are advised that it will be extremely difficult to get telephone messages to them in the residence halls during the meetings, and all concerned are advised to use the message center, if at all possible. Messages can, however, be taken at the front desk of Mosher-Jordan and Markley Halls and placed on a message board. The telephone numbers of these desks are 313-764-2106 and 313-764-1126.

In extreme emergencies, campus security can notify individuals. Their number is 313-763-1131.

**Tickets.** Tickets for the various social events may be purchased at the Transparencies section of the registration desk. Tickets for the bus tours may be purchased at the Local Information section.

**Transparencies.** Speakers wishing to prepare transparencies in advance of their talk will find the necessary materials and copying machines at this section of the registration desk. A member of the staff will be happy to assist and advise speakers on the best procedures and methods for preparation of their material.

**Visual Index.** An alphabetical list of registered participants, including local address, arrival and departure dates, is maintained in the registration area.

**University Housing.**

Participants desiring confirmed reservations for on-campus housing should have preregistered prior to the deadline of July 3, 1980. Rooms may be available for those who did not preregister, but this cannot be guaranteed.

Individuals who have not preregistered and obtained confirmed university housing should, upon arrival on campus, go to the meeting registration desk to receive a housing assignment, if a room is available. Late-comers who arrive when the meeting registration desk is closed, should go to the front desk in the Jordan wing of Mosher-Jordan Hall and inquire whether any rooms are still available.

There are several choices of accommodations available at the University of Michigan:

**Residence Hall Housing.** Mosher-Jordan Hall (62 on the campus map) is air-conditioned; Mary Markley Hall (56 on the campus map) is not. All families must be housed in Markley. The two complexes are within a three-minute walk of each other (approximately 200 yards). Accommodations in these halls include breakfast, served daily in Markley Hall. The cost of the breakfast is included in the room/cot rates given below.

There is no charge for infants occupying a crib provided by the parents. (The university has no access to cribs; see the section on Crib Rental for more information.) Cots are available for children 12 years of age or under. Use of these cots is limited to one cot per double room, and one parent or adult must occupy one of the beds in the room where a child of 12 or younger sleeps. Any child over 12 years of age must occupy a bed, and will be charged the same rate as an adult. Children under 12 may, of course, occupy a bed, provided the adult room rate is paid. The rates for these accommodations, including breakfast, are as follows:

<table>
<thead>
<tr>
<th>With air-conditioning</th>
<th>Without air-conditioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>$18.25</td>
</tr>
<tr>
<td>Double</td>
<td>$14.25 per person</td>
</tr>
<tr>
<td>Cot</td>
<td>$7.75</td>
</tr>
</tbody>
</table>

All rates quoted are subject to a four percent state sales tax.

Late information just received reveals that some of the rooms in Mosher-Jordan contain bunk-size beds rather than twin-size. All beds in Markley Hall are twin-size. There are no double beds available. Participants will share several large communal bathrooms on each floor. The room/cot charge includes linens for the week. Included are two sheets and blanket, pillow and case. Two fresh towels and one washcloth are provided daily. Each room contains, in addition to the beds, two dressers, two desks, two student chairs, one lounge chair, two lamps, ashtrays, drinking glasses, and soap. Toilet tissue is provided in the bathrooms.

Laundry centers are located in both residence halls. These are coin-operated, and cost 50¢ for the washer and 10¢ for the dryer. Ironing boards and irons are available at the respective front desks. Participants must provide their own laundry soap or detergent.

There are several lounges and reading rooms in both buildings, some with television sets. There are no telephones in the individual residence hall rooms.
<table>
<thead>
<tr>
<th>Time</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m.</td>
<td><strong>SPECIAL SESSIONS</strong></td>
</tr>
<tr>
<td></td>
<td>Current trends in nonlinear analysis II</td>
</tr>
<tr>
<td></td>
<td>Auditorium 3, MLB</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Stochastic analysis II</td>
</tr>
<tr>
<td></td>
<td>Auditorium C, AH</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Applications of mathematics to anthropology and sociology II</td>
</tr>
<tr>
<td></td>
<td>B-116, MLB</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td><strong>SESSIONS FOR CONTRIBUTED PAPERS</strong></td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Operator theory</td>
</tr>
<tr>
<td></td>
<td>Auditorium D, AH</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Applied mathematics</td>
</tr>
<tr>
<td></td>
<td>439 MH</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td><strong>SPECIAL SESSIONS</strong></td>
</tr>
<tr>
<td></td>
<td>Models of arithmetic II</td>
</tr>
<tr>
<td></td>
<td>429 MH</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>Extremal problems in combinatorial geometry II</td>
</tr>
<tr>
<td></td>
<td>Lecture Room 1, MLB</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Analytic number theory I</td>
</tr>
<tr>
<td></td>
<td>B-115, MLB</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Mathematical symbolic manipulation on the computer II</td>
</tr>
<tr>
<td></td>
<td>Auditorium 4, MLB</td>
</tr>
<tr>
<td>11:15 a.m.</td>
<td><strong>INVITED ADDRESS</strong></td>
</tr>
<tr>
<td></td>
<td>Differentiable equations in the complex domain</td>
</tr>
<tr>
<td></td>
<td>Robert P. Kaufman, Rackham Lecture Hall</td>
</tr>
<tr>
<td>12:45 p.m.</td>
<td></td>
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<tr>
<td>1:00 p.m.</td>
<td></td>
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<tr>
<td>1:20 p.m.</td>
<td></td>
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<tr>
<td>2:15 p.m.</td>
<td></td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td></td>
</tr>
<tr>
<td>3:20 p.m.</td>
<td></td>
</tr>
</tbody>
</table>
There are, however, pay phones in each building in the lobby area.

Consumption of alcoholic beverages by participants is permitted in the residence halls. The legal drinking age is 21. Pets are not allowed.

Check-in for rooms in either Markley or Mosher-Jordan will take place at the front desk in the Jordan wing of Mosher-Jordan Hall on Observatory Street. Prior to Sunday, August 17, the desk will be open from 9:00 a.m. to 10:00 p.m. The desk will be open 24 hours daily during the period Sunday through Friday, August 17-22. Breakfast tickets will be issued at housing check-in.

It will not be possible for participants to occupy residence hall rooms prior to Friday, August 15, or after noon on Saturday, August 23. If housing requests are received for dates before August 15 or after August 23, they will be honored for the period August 15-22 only. Residence hall reservations do not require an advance deposit; however, full payment for rooms at the residence hall must be made at check-in time. Cash and personal or travelers' checks will be accepted; credit cards will not be honored. A key deposit of $5 will be collected at check-in, and refunded when the keys are returned. Two keys will be issued; one key opens the front door of the residence hall, and the other is the room key.

**Cambridge House** (formerly Michigan Union) (60 on the Campus map). Most rooms in Cambridge House have two single beds, are air-conditioned, with private bath, telephone, and television set. The rates here, also subject to the four percent state sales tax, are: Single $25; Double $35. A cot can be added at an additional cost of $5/day. Participants should use the Thompson Street entrance when checking in. The desk is staffed 24 hours daily. When away from the desk, the attendant may be summoned by ringing the bell. The Cambridge House will accept cash, personal or travelers' checks, and Visa or Master Charge. There is free parking for guests staying at Cambridge House.

**Michigan League** (59 on the campus map). A limited number of rooms with two single beds and private baths are available at the Michigan League. All rooms are air-conditioned. The rates here are also subject to the four percent state sales tax, and are: Single $26; Double $32. The League will accept cash, personal or travelers' checks, but not credit cards. Participants should use the Ingalls Street entrance when checking in. The desk is staffed 24 hours daily. When away from the desk, the attendant may be summoned by ringing the bell.

**Campus Food Services**

**Mary Markley Hall.** A full-course, hot breakfast will be served daily from 7:00 a.m. to 9:00 a.m. starting Monday, August 18, through Saturday, August 23, in Markley Hall for the participants staying in the residence halls. Participants not staying in the residence halls will not be able to get breakfast in Markley. The dining room in Markley will not be open for lunch or dinner. There are vending machines in both residence halls offering some of the following: pastries, chips, candy, cigarettes, soft drinks, milk, and ice cream. These machines are accessible 24 hours each day, seven days each week.

**Michigan League.** The cafeteria in the League is not open for breakfast, but there is a snack bar in the basement where anyone can get breakfast starting at 7:15 a.m. for approximately $1.50, and lunch at a nominal price. The snack bar remains open until 4:00 p.m. The cafeteria is open for lunch from 11:30 a.m. to 1:15 p.m. ($1.85 for daily special, to about $3 à la carte), and for dinner from 5:00 p.m. to 7:15 p.m. ($2.25 for daily special, to about $5 à la carte). Also, there is a vending machine area in the League where soft drinks, coffee, candy, etc. are available; hours are 7:15 a.m. to 11:00 p.m. The various food services in the League are open to all participants.

**Cambridge House** (formerly Michigan Union). Participants staying in rooms at the Cambridge House can obtain, at an additional charge, a continental breakfast at the University Club in the Michigan Union complex. This breakfast is served Monday through Friday, from 7:00 a.m. to 10:30 a.m. The Club also serves lunch from 11:30 a.m. to 1:30 p.m., but no dinner is served.

**Hotel Accommodations**

Blocks of rooms have been set aside for use by participants at the Bell Tower Hotel and the Campus Inn. Both hotels are within easy walking distance of campus; exact locations are shown on the campus map. The rates listed were guaranteed for reservations received before July 3, but are now subject to change.

The following codes apply: **FP** = Free Parking; **SP** = Swimming Pool; **AC** = Air-Conditioned; **TV** = Television; **CL** = Cocktail Lounge; **RT** = Restaurant. In all cases "Single" refers to one person in one bed; "Double" refers to two persons in one double bed. "Twin" refers to two persons in two single beds. All rates quoted are subject to four percent state sales tax, and two percent county sales tax.

**Bell Tower Hotel**

300 South Thayer Street, 48104

Telephone: 313-769-3010

Single: $30-33 Double/Twin $38-41

Code: AC, TV, CL, RT

**Campus Inn**

615 East Huron at State, 48104

Telephone: 313-769-2200

Single: $37-40 Double/Twin $45-48

Code: FP, SP, AC, TV, CL, RT

**MISCELLANEOUS INFORMATION**

**Camping.** There are several excellent campgrounds located approximately thirty miles from campus. Information concerning campgrounds (and picnic areas) will be available at the Local Information Section of the Joint Mathematics Meetings registration desk.
<table>
<thead>
<tr>
<th>Time</th>
<th>American Mathematical Society</th>
<th>Other Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:20 p.m. - 4:10 p.m.</td>
<td></td>
<td>MAA - INVITED ADDRESS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mathematical modeling in the biological sciences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>John A. Jacquez, Auditorium 3, MLB</td>
</tr>
<tr>
<td>3:30 p.m. - 5:00 p.m.</td>
<td></td>
<td>MME - CONTRIBUTED PAPER SESSION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1035 AH</td>
</tr>
<tr>
<td>3:30 p.m. - 4:40 p.m.</td>
<td></td>
<td>IMS - INVITED SESSION V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applied probability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Howard Taylor (chairman)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Auditorium A, AH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diffusion models with storage and service networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Michael Harrison</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Storage models with Levy inputs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and arbitrary release rules</td>
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<tr>
<td></td>
<td></td>
<td>Sidney Resnick</td>
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<tr>
<td>3:30 p.m.</td>
<td></td>
<td>IMS - CONTRIBUTED PAPER SESSION V</td>
</tr>
<tr>
<td>4:05 p.m.</td>
<td></td>
<td>Auditorium B, AH</td>
</tr>
<tr>
<td>3:30 p.m. - 5:30 p.m.</td>
<td></td>
<td>AWM - OPEN MEMBERSHIP MEETING</td>
</tr>
<tr>
<td>4:00 p.m. - 5:00 p.m.</td>
<td></td>
<td>Auditorium 4, MLB</td>
</tr>
<tr>
<td>4:20 p.m. - 5:10 p.m.</td>
<td></td>
<td>MAA - INVITED ADDRESS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>An introduction to the finite element method</td>
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<tr>
<td></td>
<td></td>
<td>Richard S. Falk, Rackham Lecture Hall</td>
</tr>
<tr>
<td>4:20 p.m. - 5:10 p.m.</td>
<td></td>
<td>MAA - Session on archives and history of</td>
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<tr>
<td></td>
<td></td>
<td>mathematics</td>
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<tr>
<td></td>
<td></td>
<td>G. Bailey Price (presider)</td>
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<tr>
<td></td>
<td></td>
<td>Auditorium 3, MLB</td>
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<tr>
<td></td>
<td></td>
<td>Archives of American mathematics</td>
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<tr>
<td></td>
<td></td>
<td>Albert C. Lewis</td>
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<td></td>
<td></td>
<td>Who gave you the e?—or The origins of</td>
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<tr>
<td></td>
<td></td>
<td>Cauchy’s rigorous calculus</td>
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<tr>
<td></td>
<td></td>
<td>Judith V. Grabiner</td>
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<tr>
<td></td>
<td></td>
<td>Applications of mathematics in rocket work and</td>
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<tr>
<td></td>
<td></td>
<td>computing during World War II</td>
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<tr>
<td></td>
<td></td>
<td>J. Barkley Rosser</td>
</tr>
<tr>
<td>5:00 p.m. - 6:00 p.m.</td>
<td></td>
<td>MAA - Committee on Two-Year Colleges</td>
</tr>
<tr>
<td>6:30 p.m.</td>
<td></td>
<td>INFORMAL MEETING</td>
</tr>
<tr>
<td>9:00 p.m.</td>
<td></td>
<td>PICNIC</td>
</tr>
<tr>
<td></td>
<td>Romanoff’s on Pontiac Trail</td>
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</tr>
<tr>
<td></td>
<td>BEER PARTY</td>
<td>Romanoff’s on Pontiac Trail</td>
</tr>
<tr>
<td>THURSDAY, August 21</td>
<td>AMS</td>
<td>Other Organizations</td>
</tr>
<tr>
<td>8:30 a.m. - 4:30 p.m.</td>
<td></td>
<td>REGISTRATION</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ballroom, Michigan League</td>
</tr>
<tr>
<td>8:30 a.m. - 11:20 a.m.</td>
<td></td>
<td>SPECIAL SESSION</td>
</tr>
<tr>
<td>8:45 a.m. - 9:45 a.m.</td>
<td></td>
<td>Univalent functions: Recent developments III</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Room 2, MLB</td>
</tr>
<tr>
<td>9:00 a.m. - 12:20 p.m.</td>
<td></td>
<td>COLLOQUIUM LECTURE III</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Between logic and arithmetic:</td>
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<tr>
<td></td>
<td></td>
<td>Definability in fields</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Julia B. Robinson, Rackham Lecture Hall</td>
</tr>
<tr>
<td>9:00 a.m. - 11:50 a.m.</td>
<td></td>
<td>SPECIAL SESSION</td>
</tr>
<tr>
<td>9:00 a.m. - 11:50 a.m.</td>
<td></td>
<td>Codes, groups, and designs I</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture Room 1, MLB</td>
</tr>
<tr>
<td>9:00 a.m. - 11:50 a.m.</td>
<td></td>
<td>Mathematical symbolic manipulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>on the computer III</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Auditorium 4, MLB</td>
</tr>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td></td>
<td>INVITED ADDRESS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The arithmetic theory of loop groups</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Howard Garland, Rackham Lecture Hall</td>
</tr>
</tbody>
</table>
Athletic Facilities. Extensive indoor and outdoor recreational facilities are available. The Central Campus Recreation Building (CCRB) (13 on the campus map) contains courts for racquetball, squash, volleyball, and basketball, and a swimming pool, indoor jogging track, weight-training room, saunas and other features. Nearby outdoor facilities include a jogging track, softball fields and tennis courts. Hours of availability and reservation procedures will be posted. Recreation passes can be purchased at the Mosher-Jordan Hall desk during the meetings at a cost of $2 per day, or $6 per week.

Book Stores. The campus bookstore, located in the basement of the Michigan Union (60 on the campus map) will be open 9:00 a.m. to 5:30 p.m., weekdays. In addition, there are off-campus bookstores located on State Street, East University, and South University Avenue, nearby.

Out-of-town papers, and esoteric literature may be found at the Blue Front, located at the intersection of two-and-one-half and five-and-one-half, Monday through Friday, from 7:15 a.m. to 10:00 p.m. daily.

Child Care. The Little Angels Nursery at 2455 Washtenaw, Ann Arbor, Michigan 48104 (telephone 313-769-9561) will accept children between the ages of two-and-one-half and five-and-one-half, Monday through Friday, from 7:15 a.m. to 5:30 p.m. Rates are $1.50 per hour for one child, or $2 per hour for two children from the same family. Children can bring their own lunch, or the nursery will provide a nutritious noontime meal for $.1. Participants should call the day before to make reservations.

A list of babysitters will be available at the Local Information section of the registration desk.

Crib Rental. Rental cribs are available from A-1 Rental, Inc., 2285 West Liberty, Ann Arbor, Michigan 48103 (telephone 313-663-0060). Advance reservations should be made by mail.

Entertainment. The University of Michigan is pleased to host the August 1980 Joint Mathematics Meetings on the silver anniversary of the last such occasion in August 1955. The Local Arrangements Committee has planned a number of activities for participants and their families.

On Sunday, August 17, the University of Michigan Computing Center will host an informal open house and tour, from 2:00 p.m. to 5:00 p.m. Light refreshments will be available. Since the Computing Center is on the North Campus, interested participants should take the free campus bus; the trip takes about 15 minutes. Information on the bus schedule can be obtained at the desk in Mosher-Jordon.

On Tuesday, August 19, the committee has arranged a tasting of from 18 to 24 assorted wines in the Rackham Assembly Hall, Room 4600, from 8:00 p.m. to 11:00 p.m. Due to space, the number of participants will be limited. Tickets are $8.50 each; local liquor laws prohibit sale of tickets at the door.

On Wednesday, August 20, the traditional summer picnic will be held at Romanoff's on Pontiac Trail, a private picnic grounds 8.5 miles northeast of Ann Arbor. An ox roast will be featured, accompanied by assorted relishes, American potato salad, German potato salad, Boston baked beans, Italian rigatoni, rye and French breads, coffee, iced tea, milk, and Michigan melon. Again, the number who will be able to attend is limited, and those wishing tickets should have purchased them when preregistering. Adult tickets are $8, including transportation. No ticket is required for a child under six years of age, but children six and over must purchase an adult ticket. Beer will be sold by the glass during the picnic, and the traditional summer beer party will follow the picnic. Buses for the trip to Romanoff's will leave Mosher-Jordan Hall at 5:00 p.m. and 6:00 p.m., and from Thompson Street entrance to the Cambridge House at 5:30 p.m. All buses will stop at the Michigan League before proceeding to Romanoff's. The meal will be served at 6:30 p.m. The first bus returning to campus will leave at 9:00 p.m., and the last bus at 11:00 p.m. All buses will be clearly marked "MATHEMATICS MEETINGS," and monitors will be on hand to assist participants with tickets.

On Thursday, August 21, a concert will be given in the Rackham Lecture Hall at 8:30 p.m. by Jerome Jelinek, a cellist and member of the University of Michigan School of Music, and Joseph Gurt, a pianist and member of the Eastern Michigan University music faculty. There will be no admission charge.

Two special bus trips are planned for Thursday, August 21. The bus charge for each of these two trips is $1 per passenger, round-trip. Since the maximum number of passengers to be accommodated on each of the two trips is 125, interested persons must purchase their bus tickets at the Local Information Section of the registration desk before noon on Wednesday, August 20. No tickets will be sold at the bus boarding stops. If there is not enough interest in these trips, they will be canceled and an announcement will be made some time after noon on Wednesday, August 20.

The Ford Motor Company River Rouge Plant tour has been cancelled by Ford. A trip to Kensington Metropark is offered in place of the Ford tour. This 4,350 acre playground is located about 24 miles northeast of Ann Arbor. The 1,200 acre Kent Lake is ideal for fishing, boating, swimming, and tours aboard the Island Queen, a 60-passenger sternwheeler providing 45-minute trips (at a cost of $1.50 per adult and children under 15, $1). Facilities include: two beaches with beachhouses, dressing rooms, showers, food services, several nature trails for self-guided walks, a nature center, Canadian geese, aluminum rowboats and sail boats for rent, and a restaurant offering snacks, sandwiches, and complete meals. The bus will leave from Mosher-Jordan at 9:00 a.m. and will leave Kensington Metropark for the return trip at 4:00 p.m.
<table>
<thead>
<tr>
<th>Time</th>
<th>Section</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 a.m.</td>
<td>SPECIAL SESSIONS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analytic number theory II</td>
<td>B-115 MLB</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Orthogonal polynomials and other extremal polynomials III</td>
<td>35 AH</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Hardy spaces and harmonic analysis I</td>
<td>Auditorium D, AH</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Stochastic analysis III</td>
<td>Auditorium C, AH</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Applications of mathematics to anthropology and sociology III</td>
<td>B-116 MLB</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>SPECIAL SESSION</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Models of arithmetic III</td>
<td>429 MH</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>SESSION FOR CONTRIBUTED PAPERS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General topology and real analysis</td>
<td>439 MH</td>
</tr>
<tr>
<td>11:15 a.m.</td>
<td>INVITED ADDRESS</td>
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<td></td>
<td>Whitehead torsion old and new, and its relationship with the geometric topology</td>
<td>Rackham Lecture Hall</td>
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<tr>
<td>1:00 p.m.</td>
<td>SPECIAL SESSION</td>
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<td></td>
<td>Univalent functions: Recent developments IV</td>
<td>Lecture Room 2, MLB</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>SESSIONS FOR CONTRIBUTED PAPERS</td>
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<tr>
<td></td>
<td>General Session</td>
<td>B-116 MLB</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>Ring theory and matrix theory</td>
<td>439 MH</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>Differential equations</td>
<td>Auditorium C, AH</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>Geometry and topology</td>
<td>429 MH</td>
</tr>
<tr>
<td>1:30 p.m.</td>
<td>SPECIAL SESSION</td>
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<tr>
<td></td>
<td>Analytic number theory III</td>
<td>B-115 MLB</td>
</tr>
<tr>
<td>1:30 p.m.</td>
<td>Orthogonal polynomials and other extremal polynomials IV</td>
<td>35 AH</td>
</tr>
<tr>
<td>1:30 p.m.</td>
<td>Hardy spaces and harmonic analysis II</td>
<td>Auditorium 4, MLB</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Codes, groups, and designs II</td>
<td>Lecture Room 1, MLB</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Mathematical methods in wave propagation II</td>
<td>Auditorium 3, MLB</td>
</tr>
</tbody>
</table>
The second bus trip will be to the Greenfield Village-Henry Ford Museum complex. Greenfield Village is a 240 acre indoor-outdoor museum containing nearly a hundred historic buildings and artifacts (Edison's laboratory, a London clocktower, Henry Ford's early home, a Cotswold cottage, a steam locomotive that runs, an operating paddle-wheel steamboat, etc.). The Ford Museum is devoted to items illustrating America's inventive genius. The buses for this trip will leave from Mosher-Jordan Hall at 9:30 a.m., and leave the Museum-Village complex at 4:30 p.m., to arrive back at Mosher-Jordan Hall at about 6:00 p.m. There is a restaurant at the Museum-Village complex. Admission to the Museum or Village costs $4.25 for adults, and $2.25 for children 6 to 10 years of age. Separate admission charges are made for the Museum and the Village. (On one trip it is customary to choose one of the two to visit.)

Libraries. The university's general library (Harlan Hatcher Graduate Library, 34 on the campus map) will be open 8:00 a.m. to 10:00 p.m., Monday through Friday; Saturday, 10:00 a.m. to 6:00 p.m.

The Mathematics Library, located in Room 3027 on the third floor of Angell Hall (4 on the campus map) will be open from 8:00 a.m. to 5:00 p.m., Monday through Friday.

The Ann Arbor Public Library, located four blocks from Angell Hall at the corner of East William and South Fifth Avenue, will be open from 10:00 a.m. to 9:00 p.m. on Monday, and from 9:00 a.m. to 9:00 p.m., Tuesday through Friday.

Local Information. Information will also be available at the Local Information section of the registration desk on other local places of interest.
### TIMETABLE

**THURSDAY, August 21**

<table>
<thead>
<tr>
<th>Time</th>
<th>American Mathematical Society</th>
<th>Other Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 p.m. - 4:00 p.m.</td>
<td>MATHEMATICAL REVIEWS OPEN HOUSE</td>
<td>SESSIONS FOR CONTRIBUTED PAPERS</td>
</tr>
<tr>
<td>2:30 p.m. - 3:40 p.m.</td>
<td>Combinatorics</td>
<td>B-116 MLB</td>
</tr>
<tr>
<td>2:30 p.m. - 3:25 p.m.</td>
<td>Probability</td>
<td>Auditorium C, AH</td>
</tr>
<tr>
<td>4:00 p.m. - 5:00 p.m.</td>
<td>PRIZE SESSION</td>
<td>Rackham Lecture Hall</td>
</tr>
<tr>
<td>5:00 p.m. - 6:00 p.m.</td>
<td>BUSINESS MEETING</td>
<td>Rackham Lecture Hall</td>
</tr>
<tr>
<td>8:30 p.m.</td>
<td>CONCERT</td>
<td>Rackham Lecture Hall</td>
</tr>
</tbody>
</table>

**FRIDAY, August 22**

<table>
<thead>
<tr>
<th>Time</th>
<th>AMS</th>
<th>SPECIAL SESSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 a.m. - 8:55 a.m.</td>
<td>SESSION FOR CONTRIBUTED PAPERS</td>
<td>Partial differential equations</td>
</tr>
<tr>
<td>8:30 a.m. - 1:30 p.m.</td>
<td>ASSISTANCE AND INFORMATION DESK</td>
<td>Auditotium 3, MLB</td>
</tr>
<tr>
<td>8:30 a.m. - 9:50 a.m.</td>
<td>SPECIAL SESSION</td>
<td>Analytic number theory IV</td>
</tr>
<tr>
<td>8:45 a.m. - 9:45 a.m.</td>
<td>COLLOQUIUM LECTURE IV</td>
<td>Between logic and arithmetic: Nonstandard models of arithmetic</td>
</tr>
<tr>
<td>9:00 a.m. - 11:20 a.m.</td>
<td>SPECIAL SESSIONS</td>
<td>Codes, groups, and designs III</td>
</tr>
<tr>
<td>9:00 a.m. - 10:50 a.m.</td>
<td>Hardy spaces and harmonic analysis III</td>
<td>Auditorium 4, MLB</td>
</tr>
<tr>
<td>9:00 a.m. - 11:50 a.m.</td>
<td>SESSION FOR CONTRIBUTED PAPERS</td>
<td>Mathematical methods in wave propagation III</td>
</tr>
<tr>
<td>9:15 a.m. - 10:55 a.m.</td>
<td>SPECIAL SESSION</td>
<td>Classical analysis</td>
</tr>
<tr>
<td>10:00 a.m. - 11:00 a.m.</td>
<td>INVITED ADDRESS</td>
<td>Sieves and combinatorial inequalities: from Eratosthenes to Chen</td>
</tr>
<tr>
<td>10:00 a.m. - 11:20 a.m.</td>
<td>SPECIAL SESSION</td>
<td>Heini Halberstam, Rackham Lecture Hall</td>
</tr>
<tr>
<td>10:00 a.m. - 12:10 p.m.</td>
<td>SESSION FOR CONTRIBUTED PAPERS</td>
<td>Topos theory I</td>
</tr>
<tr>
<td>10:00 a.m. - 12:10 p.m.</td>
<td>Logic, set theory, and computer science</td>
<td>B-116 MLB</td>
</tr>
<tr>
<td>11:15 a.m. - 12:15 p.m.</td>
<td>INVITED ADDRESS</td>
<td>The norm preserving lifting of intertwining of vectors and its applications</td>
</tr>
<tr>
<td>12:30 p.m. - 2:50 p.m.</td>
<td>SPECIAL SESSIONS</td>
<td>Ciprian Flolias, Rackham Lecture Hall</td>
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<tr>
<td>12:30 p.m. - 3:00 p.m.</td>
<td>Analytic number theory V</td>
<td>B-116 MLB</td>
</tr>
<tr>
<td>1:00 p.m. - 3:00 p.m.</td>
<td>Topos theory II</td>
<td>Lecture Room 2, MLB</td>
</tr>
<tr>
<td>1:00 p.m. - 2:50 p.m.</td>
<td>Codes, groups, and designs IV</td>
<td>Lecture Room 1, MLB</td>
</tr>
<tr>
<td>1:00 p.m. - 2:50 p.m.</td>
<td>Hardy spaces and harmonic analysis IV</td>
<td>Auditorium 4, MLB</td>
</tr>
<tr>
<td>1:00 p.m. - 2:50 p.m.</td>
<td>Mathematical methods in wave propagation IV</td>
<td>Auditorium 3, MLB</td>
</tr>
</tbody>
</table>
Medical Services. The University Health Service (36 on the campus map) will be open from 8:00 a.m. to 5:00 p.m., Monday through Friday, and 8:00 a.m. to noon on Saturday. Emergency service is available at the Health Service from 5:00 p.m. to midnight, Monday through Friday.

The Emergency Clinic located in University Hospital (334 on the campus map) will be open twenty-four hours every day.

Parking. All university parking lots and structures are patrolled by the Ann Arbor city police, and one must have a university parking permit. Guest permits will be sold at the desk in Mosher-Jordan Hall at a cost of $1 per day. Participants are cautioned that one must have a permit even for metered campus lots, in addition to putting money in the meter. University parking structures on campus are listed in bold-face type in the legend for the campus map. In addition, participants should be aware that there are university lots adjacent to Mosher-Jordan Hall and Mary Markley Hall.

Travel. Ann Arbor is a city of 100,000 located about 45 miles west of Detroit. It enjoys excellent accessibility by air or road, and is also served by Greyhound, Shortway, and North Star bus lines. Amtrak provides excellent service, with three trains daily each way between Chicago and Detroit which stop at Ann Arbor.

Major airlines have scheduled flights to Detroit Metropolitan Airport, which is located conveniently between Ann Arbor and Detroit. Frequent bus and limousine service from the airport is available for the twenty-eight mile trip to Ann Arbor. The current round-trip limousine fare is $13.70, with departures scheduled every thirty minutes on the hour and half-hour. The current taxi fare between Detroit Metro and Ann Arbor is $21. Taxis can accommodate four passengers. Please note that both limousine and taxi rates are subject to change. All major car rental companies have offices at the airport, and several have offices in Ann Arbor.

Participants who plan on using the limousine service from Detroit Metro to the campus are asked to supply flight information on the preregistration/housing form so that the limousine company will be able to provide adequate equipment for all planning to travel to Ann Arbor at the same time from Detroit Metro. The limousine will take participants to Mosher-Jordan, if so requested.

Participants wishing return limousine service from the residence halls to Detroit Metro should make their own reservations by calling Airport Service Line, Inc., at 800-552-3700 (toll free), twenty-four hours in advance. The regularly scheduled limousine stops at Cambridge House (where schedule information is available) and at the downtown Ann Arbor hotels.

Weather. The weather in Ann Arbor is often warm and humid with daytime highs in the 80s and lows in the 60s (Fahrenheit). Since 1940, August temperature extremes have ranged from 99°F (1955) to 40°F (1965). Average rainfall for the month is 2.69 inches with thunderstorms occurring on the average on 6 days in the month.
PROGRAM OF THE SESSIONS

The time limit for each contributed paper in the AMS general sessions is ten minutes. To maintain the schedule, the time limits will be strictly enforced.

Abstracts for papers presented in AMS sessions at this meeting will be found in the August 1980 issue of Abstracts of papers presented to the American Mathematical Society. Numbers in parentheses following the listings below indicate the order in which the abstracts are printed in that journal.

For papers with more than one author, an asterisk follows the name of the author who plans to present the paper at the meeting.

TUESDAY, 1:00 P.M.

Colloquium Lectures, Lecture I, Rackham Lecture Hall

1. Between logic and arithmetic: Fifty years after Gödel’s discoveries. Professor JULIA B. ROBINSON, University of California, Berkeley

TUESDAY, 2:15 P.M.

Session on Number Theory, B-115, Modern Language Building

2:15-2:25 Diophantus I and II. Professor JOSEPH ARKIN*, Spring Valley, New York, Professor V. E. HOGGATT, Jr., San Jose State University, and Professor E. G. STRAUSS, University of California, Los Angeles (779-10-9)

2:30-2:40 Matrices and Pythagorean triples. Preliminary report. Dr. SYLVAN BURGSTAHLER, University of Minnesota, Duluth (779-10-19)

2:45-2:55 A special class of primitive roots. Preliminary report. Professor MICHAEL E. MAYS, West Virginia University (779-10-28)

3:00-3:10 Knuth’s iterated powers modulo m. Preliminary report. Professor G. R. BLAKLEY and Professor I. BOROSH*, Texas A & M University (779-10-27)

3:15-3:25 Analysis of certain operators on $L^2(\mathbb{Z})$. Professor JOSEPH LEWITTES, CUNY, Herbert H. Lehman College (779-10-17)

TUESDAY, 2:15 P.M.

Session on Group Theory, 439 Mason Hall

2:15-2:25 Fitting height of solvable groups admitting an automorphism of prime order with abelian fixed-point subgroup. Professor ARNOLD D. FELDMAN, Franklin and Marshall College (779-20-4)

2:30-2:40 Degree formulas for the orthogonal groups over GF(2). Professor J. S. FRAME, Michigan State University (779-20-2)

2:45-2:55 Annihilators of cohomology modules. GEORGE S. AVRUNIN, University of Massachusetts, Amherst (779-20-3)

3:00-3:10 Basic commutators and extensions applied to free products. Professor ANTHONY M. GAGLIONE, U.S. Naval Academy (779-20-1)

3:15-3:25 Reduction of principal series representations of symplectic groups. Preliminary report. Professor THOMAS A. FARMER, Miami University, Oxford (779-22-1)

TUESDAY, 2:15 P.M.

Session on Banach Spaces, Auditorium D, Angell Hall

2:15-2:25 The spectrum of a class of Toeplitz operators. Dr. ROSHDl KHALIL and Dr. NAzIH FAOUR*, University of Kuwait (779-46-1)

2:30-2:40 Basic sequences in nuclear stable $L_r(b,r)$-spaces, $0 < r < \infty$. Dr. MEFHARET ALPSEYMEN, Middle East Technical University, Ankara, Turkey (779-46-2)

(Introduced by Professor Ersan Akyildiz)

2:45-2:55 Geometry and nonlinear analysis in Banach spaces. I. Preliminary report. Professor S. KONDAGUNTA, Cleveland State University (779-46-3)

3:00-3:10 Uniformly complemented $l^p_n$'s in quasi-reflexive Banach spaces. Professor STEVEN F. BELLENOT, Florida State University and Clarkson College (779-46-7)

TUESDAY, 2:30 P.M.

Special Session on Models of Arithmetic. I, 429 Mason Hall

2:30-2:50 Survey of the new independence results in arithmetic. GEORGE H. MILLS, St. Olaf College (779-03-12)
3:00- 3:20 (18) A finite combinatorial principle related to the Galvin-Prikry theorem. STEPHEN G. SIMPSON, Pennsylvania State University, University Park (779-03-2)

3:30- 3:50 (19) Cofinal extension preserves recursive saturation. C. SMORYŃSKI*, Westmont, Illinois, and J. STAHI, Bar-Ilan University, Israel (779-03-1)

4:00- 4:20 (20) Uncountable recursively saturated models of Peano arithmetic. JAMES H. SCHMERL, University of Connecticut, Storrs (779-03-9)

4:30- 4:50 (21) Computational complexity and models of arithmetic. Preliminary report. Professor RICHARD J. LIPTON, Princeton University (779-03-13)

TUESDAY, 2:30 P.M.

Special Session on Extremal Problems in Combinatorial Geometry. I, Lecture Room 1, Modern Language Building

2:30- 2:50 (22) On Steiner trees for bounded point sets. Dr. RONALD L. GRAHAM and Dr. FAN R. K. CHUNG*, Bell Laboratories, Murray Hill, New Jersey (779-05-23)

3:00- 3:20 (23) Problems in discrete geometry. WILLIAM O. J. MOSER, McGill University (779-05-21)


4:00- 4:20 (25) Painting the plane with three colors. Professor ERNST G. STRAUS* and Professor ALFRED W. HALEs, University of California, Los Angeles (779-05-19)

4:30- 4:50 (26) Extremal configurations of n points on a sphere, rectangle, circle, etc. Preliminary report. Professor KENNETH B. STOLARSKY, University of Illinois, Urbana-Champaign (779-52-3)

5:00- 5:20 (27) The independent sets of a matroid. Preliminary report. Professor GEORGE B. PURDY, Texas A & M University (779-05-17)

TUESDAY, 2:30 P.M.

Special Session on Univalent Functions: Recent Developments. I, Lecture Room 2, Modern Language Building

2:30- 2:50 (28) Support points and subordination for families of conformal mappings. Professor W. E. KIRWAN*, University of Maryland, College Park, and Professor GLENN E. SCHOBER, University of Indiana, Bloomington (779-99-1)

3:00- 3:20 (29) New support points of S and extreme points of HS. KENT PEARCE, State SUNY, Albany (779-30-1)

3:30- 3:50 (30) Variability regions for families of univalent functions. Preliminary report. Professor T. H. MacGREGOR, SUNY, Albany (779-30-3)

4:00- 4:20 (31) Starlike continued fractions. Professor E. P. MERKES, University of Cincinnati (779-30-18)

4:30- 4:50 (32) Univalent functions starlike with respect to a boundary point. Professor MALCOM S. ROBERTSON, West Vancouver, Canada (779-30-8)

5:00- 5:20 (33) Convolution multipliers and starlike functions. Preliminary report. T. SHEIL-SMALL, University of York, England, H. SILVERMAN, College of Charleston, South Carolina, and E. SILVIA*, University of California, Davis (779-30-5)

TUESDAY, 2:30 P.M.

Special Session on Orthogonal Polynomials and Other Extremal Polynomials. I, 35 Angell Hall

2:30- 2:50 (34) Informal discussion of the life and work of Geza Freud, with Paul G. Nevai as Moderator

3:00- 3:20 (35) A nonnegative representation of the linearization coefficients of the product of Jacobi polynomials. Professor MIZAN RAHMAN, Carleton University (779-33-3)

3:30- 3:50 (36) Orthogonal polynomials and linear difference equations. Preliminary report. Professor PAUL G. NEVAI, Ohio State University, Columbus (779-42-1)

4:00- 4:20 (37) On the Borel summability and convergence of expansions in Laguerre polynomials at the endpoint. Professor LEE LORCH*, York University, and Professor DONALD J. NEWMAN, Temple University (779-41-1)

4:30- 4:50 (38) Recurrence relations for orthogonal polynomials on algebraic curves. Preliminary report. Dr. FRANCISCO MARCELLÁN* and Dr. MANUEL ALFARO, Universidad de Zaragoza, Spain (779-33-7) (Introduced by Professor Joseph L. Ullman)

5:00- 5:20 (39) A q-analogue of the Laguerre polynomials. Preliminary report. DANIEL S. MOAK, Texas Tech University (779-33-9)
TUESDAY, 2:30 P.M.

Special Session on Current Trends in Nonlinear Analysis. I, Auditorium 3, Modern Language Building
2:30- 2:50 (40) Recent progress in nonlinear semigroups. Professor SIMEON REICH, University of Southern California (779-47-2)
2:55- 3:15 (41) Mathematical problems in cell electrophysiology. Professor JANE CRONIN SCANLON, Rutgers University (779-92-1)
3:20- 3:40 (42) Solvability of semilinear equations at resonance via the A-proper mapping theory. W. V. PETRYSHYN, Rutgers University (779-47-6)
3:45- 4:05 (43) Multiple solutions of semilinear Dirichlet problems. Professor ALAN C. LAZER, University of Cincinnati (779-35-12)
4:10- 4:30 (44) Numerical considerations for nonlinear problems at resonance. Professor R. KANNAN, University of Texas at Arlington (779-65-3)
5:00-5:20 (46) Lyapunov-like functions and periodic boundary value problems. Preliminary report. V. LAKSHMIKANTHAM, University of Texas at Arlington (779-34-1)

TUESDAY, 2:30 P.M.

Special Session on Mathematical Symbolic Manipulation on the Computer. I, Auditorium 4, Modern Language Building
2:30- 2:50 (47) Factoring univariate polynomials over complete valued fields. Preliminary report. HALE F. TROTTER, Princeton University (779-12-3)
3:00- 3:20 (48) An extension of an algorithm of Danilevski. Dr. DAVID J. FORD, Concordia University (779-15-4) (Introduced by Professor B. David Saunders)
3:30- 3:50 (49) Computations over GF(q). Professor ROBERT A. MORRIS, University of Massachusetts, Boston (779-14-1)
4:00- 4:20 (50) Computing Galois groups. Dr. JOHN McKAY, Concordia University (779-12-6) (Introduced by Professor B. David Saunders)
4:30- 4:50 (51) A polynomial-time algorithm for testing isomorphism of graphs of bounded valence. Preliminary report. EUGENE M. LUKS, Bucknell University (779-05-14)
5:00-5:20 (52) Computing in matrix groups over finite fields. GREGORY BUTLER, Concordia University (779-12-1) (Introduced by Professor B. David Saunders)

TUESDAY, 3:40 P.M.

Special Session on Stochastic Analysis. I, Auditorium C, Angell Hall
3:40- 4:00 (58) Representations of diffusion processes. Professor THOMAS G. KURTZ, University of Wisconsin, Madison (779-60-2)
4:05- 4:25 (59) Homogenization in stochastic differential geometry. MARK A. PINSKY, Northwestern University (779-60-8)
4:30- 4:50 (60) Some problems in stochastic processes. Professor DANIEL STROOCK, University of Colorado, Boulder (779-60-10)
TUESDAY, 3:45 P. M.
Invited Address, Rackham Lecture Hall
(61) A survey of sporadic simple groups. Professor MICHAEL E. O'NAN, Rutgers University (779-20-5)

WEDNESDAY, 8:45 A. M.
Colloquium Lectures, Lecture II, Rackham Lecture Hall
(62) Between logic and arithmetic: Diophantine equations. Professor JULIA B. ROBINSON, University of California, Berkeley

WEDNESDAY, 10:00 A. M.
Invited Address, Rackham Lecture Hall
(63) Good codes. Professor J. H. VAN LINT, Eindhoven University of Technology, Netherlands (779-94-4)

WEDNESDAY, 10:00 A. M.
Special Session on Univalent Functions: Recent Developments. II, Lecture Room 2, Modern Language Building
10:00-10:20 (64) Preservation of subordination. Preliminary report. Dr. F. R. KEOGH*, University of Kentucky, Lexington, and Dr. E. P. MERKES, University of Cincinnati (779-30-11)
10:30-10:50 (65) On a Briot-Bouquet differential subordination. Preliminary report. Professor PAUL EENIGENBURG, Western Michigan University, Professor SANFORD MILLER*, SUNY at Brockport, and University of Maryland, College Park, PETRU MOCANU, Babes-Bolyai University, Romania, and MAXWELL READE, University of Michigan, Ann Arbor (779-30-13)
11:00-11:20 (66) Schwarzian criteria for quasiconformal extensions. Preliminary report. Professor J. A. PFALTZGRAFF, University of North Carolina, Chapel Hill (779-30-17)
11:30-11:50 (67) Coefficients of inverses of univalent functions with quasiconformal extensions. Professor GLENN SCHOBER, Indiana University (779-30-15)

WEDNESDAY, 10:00 A. M.
Special Session on Orthogonal Polynomials and Other Extremal Polynomials. II, 35 Angell Hall
10:00-10:20 (68) Sums and integrals related to orthogonal polynomials in one and more dimensions. Preliminary report. Professor RICHARD ASKEY, University of Wisconsin, Madison (779-33-2)
10:30-10:50 (69) On some orthogonal polynomials. Preliminary report. Dr. MOURAD E. H. ISMAIL, Arizona State University (779-33-1)
11:00-11:20 (70) Inequalities for derivatives of polynomials with restricted zeros. ATtila MÁTÉ, Brooklyn College (779-26-3)
11:30-11:50 (71) On best multipoint local approximation. Dr. R. K. BEATSON, University of Texas, Austin, and Professor C. K. CHUI*, Texas A & M University (779-41-3)
12:00-12:20 (72) Zeros of q-orthogonal polynomials and oscillatory modes of nonlinear physical systems. Professor J. S. DEHESA, University of Granada, Spain (779-33-10)

WEDNESDAY, 10:00 A. M.
Special Session on Current Trends in Nonlinear Analysis. II, Auditorium 3, Modern Language Building
10:00-10:20 (73) A class of absolutely continuous transformations. Professor EDWARD SILVERMAN, Purdue University (779-49-2)
10:25-11:05 (74) Nonlinear integration and Weierstrass integral over a manifold. Connections with theorems on martingales. Professor CALOGERO VINTI, University of Perugia, Italy (Introduced by Professor Lamberto Cesari) (779-28-3)
11:10-11:30 (75) A remark concerning the connection between critical point theory and Leray-Schauder degree in Hilbert space. Preliminary report. Professor ERICH H. ROTHE, University of Michigan, Ann Arbor (779-46-4)
11:35-11:55 (76) Existence theorems for optimal solutions in Lagrange problems with partial differential equations. Professor LAMBERTO CESARI, University of Michigan, Ann Arbor (779-49-3)
12:00-12:20 (77) Existence theorems for parametric problems of optimal control. Dr. ROBERT M. GOOR, General Motors Research Laboratories, Warren, Michigan (779-49-4) (Introduced by Professor Lamberto Cesari)
On Poincaré's approach to closed simple geodesics on ovaloids. Professor MEL S. BERGER, University of Massachusetts, Amherst (779-49-1)

**WEDNESDAY, 10:00 A.M.**

**Special Session on Stochastic Analysis. II**, Auditorium C, Angell Hall

10:00-10:20 (79) **On some new problems of filtering for stochastic distributed parameter systems.** Professor A. BENSOUSSAN, Institut National de Recherches en Informatique et Automatique, France (779-93-1)

10:25-10:45 (80) **Boundary value problems in regions with random rough boundaries.** Professor GEORGE PAPANICOLAOU, Courant Institute of Mathematical Sciences, New York University (779-60-12)

10:50-11:10 (81) **Problem session**

11:15-11:35 (82) **Stochastic evolution equations and scaling limit theorems.** Professor D. A. DAWSON*, Carleton University, and Professor H. SALEHI, Michigan State University (779-60-5)

11:40-12:00 (83) **Exit time distributions for randomly perturbed systems and Ackerberg-O'Malley resonance.** Professor MICHAEL WILLIAMS, Virginia Polytechnic Institute and State University (779-60-4) (Introduced by Professor Pao-Liu Chow)

**WEDNESDAY, 10:00 A.M.**

**Session on Applications of Mathematics to Anthropology and Sociology. II**, B-116 Modern Language Building

10:00-10:20 (84) **Probability models of lineage systems and inheritance.** Preliminary report. Ms. PENEOPE J. GREENE, Harvard University (779-92-12) (Introduced by Professor Stephen B. Seidman)

10:30-10:50 (85) **Large-scale social networks: Theory, observation and inference.** Preliminary report. Professor ALDEN S. KLOVDAHL, The Australian National University, Australia (779-92-4) (Introduced by Professor Stephen B. Seidman)

11:00-11:20 (86) **Categorical data analysis of single and multiple sociometric relations.** Professor STEPHEN E. FIENBERG and Professor STANLEY WASSERMAN*, University of Minnesota, Minneapolis (779-92-6) (Introduced by Professor Stephen B. Seidman)

11:30-11:50 (87) **The algebra in the American kinship terminology.** Professor DWIGHT W. READ, University of California, Los Angeles (779-92-14) (Introduced by Professor Stephen B. Siedman)

12:00-12:20 (88) **Linear semigroups of social relations.** Professor JOHN BOYD, University of California, Irvine (779-92-8)

**WEDNESDAY, 10:00 A.M.**

**Session on Operator Theory**, Auditorium D, Angell Hall

10:00-10:10 (89) **Linear operators on sequence spaces.** Professor GEORGE U. BRAUER, University of Minnesota (779-40-1)

10:15-10:25 (90) **Probabilistic estimates for positive linear operators.** J. P. KING, Lehigh University (779-41-4)

10:30-10:40 (91) **Trace-class norm multipliers.** Dr. ROSHDI KHALIL, Kuwait University, Kuwait (779-47-1) (Introduced by Dr. Nazih Faour)

10:45-10:55 (92) **H^2-inequality for pseudodifferential operators.** S. ZAIDMAN, University of Montreal (779-47-4)

11:00-11:10 (93) **A simple characterization of the trace-class of operators.** Professor PARFENY P. SAWOROTNOW, The Catholic University of America (779-47-5)

11:15-11:25 (94) **Monotonic properties of some spectral resolvents.** I. ERDELYI, Temple University (779-47-8)

11:30-11:40 (95) **Locally continuous operators.** Professor G. D. ALLEN, Texas A & M University (779-47-10)

11:45-11:55 (96) **Heinz inequalities and perturbation of spectral families.** Professor ALAN McIntosh, Macquarie University, Australia (779-47-11)

**WEDNESDAY, 10:00 A.M.**

**Session on Applied Mathematics**, 439 Mason Hall

10:00-10:10 (97) **Optimization of the buckling load.** Professor VADIM KOMKOV, University of West Virginia (779-73-1)
10:15-10:25 (98) *Prediction of beach erosion due to severe storms.* Preliminary report. Professors THAD DANKEL, JR.* and RICHARD H. BURKHART, University of North Carolina, Wilmington (779-76-1)

10:30-10:40 (99) *Conformal mappings, their singularities and applications.* Professor VURYL J. KLASSEN, California State University, Fullerton (779-76-2)

10:45-10:55 (100) *The Sommerfeld wave equation.* Preliminary report. Dr. YEATON H. CLIFTON, University of Michigan, Ann Arbor (779-81-1) (Author introduced by Professor Piotr Blass)

11:00-11:10 (101) *Some solutions to the problem of magnetostatic equilibrium for 2-dimensional magnetic fields in spherical coordinates.* Preliminary report. Professor JOAN R. HUNDHAUSEN, Colorado School of Mines (779-85-1)

11:15-11:25 (102) *A mathematical model for predicting back extraction phenomena.* Preliminary report. Professor SAMUEL M. GRAFF, John Jay College of Criminal Justice, CUNY (779-90-1)

11:30-11:40 (103) *Logistics and Gompertz graph papers.* Dr. DONALD R. SNOW, Brigham Young University (779-92-15)

**WEDNESDAY, 10:30 A.M.**

Special Session on Models of Arithmetic. II, 429 Mason Hall

10:30-10:50 (104) *Turing degrees and expansions of structures.* Dr. JULIA F. KNIGHT* and Dr. MARK E. NADEL, University of Notre Dame (779-03-10)

11:00-11:20 (105) *The completeness of Peano multiplication.* Professor MARK E. NADEL, University of Notre Dame (80T-E9)

11:30-11:50 (106) *Model theory of addition and divisibility.* Preliminary report. Dr. LOU VAN DEN DRIES, Yale University (779-03-4)

**WEDNESDAY, 11:00 A.M.**

Special Session on Extremal Problems in Combinatorial Geometry. II, Lecture Room 1, Modern Language Building

11:00-11:20 (107) *Two-coloring Euclidean two-arrangements and factoring a reversal.* Preliminary report. Professor J. RALPH ALEXANDER, Professor RICHARD L. BISHOP, and Professor JOHN E. WETZEL*, University of Illinois at Urbana-Champaign (779-51-3)

11:30-11:50 (108) *Overlapping annuli and the physics of crystals.* Preliminary report. Professor CHARLES RADIN, University of Texas, Austin (779-52-2)

12:00-12:20 (109) *Abutting nonoverlapping unit squares.* Professors M. S. KLAMKIN* and A. LIU, University of Alberta (779-05-20)

**WEDNESDAY, 11:00 A.M.**

Special Session on Analytic Number Theory. I, B-115 Modern Language Building

11:00-11:20 (110) *Real Gauss sums over finite fields.* Professor RONALD J. EVANS, University of California, San Diego (779-10-3) (Introduced by Professor Bruce C. Berndt)

11:30-11:50 (111) *Binomial coefficients and Jacobi sums.* Dr. RICHARD H. HUDSON, Carleton University (779-10-26)

12:00-12:20 (112) *Period polynomials and Gauss sums for finite fields.* Dr. GERALD MYERSON, SUNY at Buffalo (779-10-7)

**WEDNESDAY, 11:00 A.M.**

Special Session on Mathematical Symbolic Manipulation on the Computer. II, Auditorium 4, Modern Language Building

11:00-11:20 (113) *On the complexity of some algebraic operations.* DAVID Y. Y. YUN, IBM Thomas J. Watson Research Center, Yorktown Heights (779-68-6) (Introduced by Professor B. David Saunders)

11:30-11:50 (114) *On a problem of Collins.* HANS ZASSENKAUS, Ohio State University, Columbus (779-12-4)

12:00-12:20 (115) *Cylindrical algebraic decomposition and quantifier elimination.* Professor GEORGE E. COLLINS, University of Wisconsin, Madison (779-12-5)

**WEDNESDAY, 11:15 A.M.**

Invited Address, Rackham Lecture Hall

116) *Differential equations in the complex domain.* Professor ROBERT P. KAUFMAN, University of Illinois, Urbana-Champaign (779-30-14)
THURSDAY, 8:30 A.M.

Special Session on Univalent Functions: Recent Developments. III, Lecture Room 2, Modern Language Building
8:30- 8:50 (117) Close-to-convex and Bazilevic curves. Preliminary report. Professor J. R. QUINE, Florida State University (779-30-21)
9:00- 9:20 (118) The coefficient problem for Bazilevic functions. Dr. RONALD J. LEACH, Howard University (779-30-6)
9:30- 9:50 (119) Univalent functions with varying arguments. Preliminary report. HERB SILVERMAN, College of Charleston (779-30-7)

10:00-10:20 (120) Integral means of analytic functions. Professor PAUL J. EENIGENBURG, Western Michigan University (779-30-20)
10:30-10:50 (121) Certain sufficient conditions for univalency of the class $C'$. Professor H. S. AL-AMIRI*, Bowling Green State University, and Professor PETRU MOCANU, Babes-Bolyai University, Romania (779-30-22)
11:00-11:20 (122) The Marx conjecture for starlike functions. Professor JAMES A. HUMMEL, University of Maryland, College Park (779-30-26)

THURSDAY, 8:45 A.M.

Colloquium Lectures, Lecture III, Rackham Lecture Hall
(123) Between logic and arithmetic: Definability in fields. Professor JULIA B. ROBINSON, University of California, Berkeley

THURSDAY, 9:00 A.M.

Special Session on Codes, Groups, and Designs. I, Lecture Room 1, Modern Language Building
9:00- 9:20 (124) The connection between codes and designs. Dr. F. J. MacWILLIAMS, Bell Laboratories, Murray Hill, New Jersey (779-05-22)
10:00-10:20 (126) On (P and Q)-polynomial association schemes with large diameter. Professor EIICHI BANNAI, Ohio State University, Columbus (779-05-12)
10:30-10:50 (127) Homogeneous Steiner systems of type $3-(\nu,\{4,6\},\gamma)$. Professor E. F. ASSMUS, Jr., Lehigh University (779-05-3)
11:30-11:50 (129) Matrix design of Hadamard matrix. NOBORU ITO, University of Illinois at Chicago Circle (779-05-2)
12:00-12:20 (130) Arrays of strengths on two symbols. Professor J. Q. LONGYEAR, Wayne State University (779-05-8)

THURSDAY, 9:00 A.M.

Special Session on Mathematical Symbolic Manipulation on the Computer. III, Auditorium 4, Modern Language Building
9:00- 9:20 (131) Algebraic asymptotic analysis. Preliminary report. Dr. MAXWELL ROSENBLICHT, University of California, Berkeley (779-41-6)
9:30- 9:50 (132) Integration of algebraic functions. JAMES DAVENPORT, IBM Thomas J. Watson Research Center, Yorktown Heights (779-68-5) (Introduced by Professor B. David Saunders)
10:00-10:20 (133) Solving first order ordinary differential equations in closed form on a computer. Preliminary report. BRUCE W. CHAR, University of California, Berkeley (779-68-4) (Introduced by Professor B. David Saunders)
10:30-10:50 (134) An algorithm for solving second order linear homogeneous differential equations. JERALD J. KOVACIC, Brooklyn College, CUNY (779-34-4)
11:00-11:20 (135) Liouvillian solutions of nth order homogeneous linear differential equations. MICHAEL F. SINGER, Princeton University and North Carolina State University (779-12-2)
THURSDAY, 9:00 A.M.

Special Session on Mathematical Methods in Wave Propagation. I, Auditorium 3, Modern Language Building
9:00- 9:20 (137) Some new applications of Wiener-Hopf theory to diffraction theory. Professor ALBERT E. HEINS, University of Michigan, Ann Arbor (779-78-2)

9:30- 9:50 (138) The effect of a protective enclosure on underwater measurements of the magnetic field induced by ocean currents. Dr. I. W. KAY* and Dr. W. WASYLKIWSKYJ, Institute for Defense Analyses, Arlington, Virginia (779-78-3)

10:00-10:20 (139) Multiple scattering theory. VICTOR TWERSKY, University of Illinois at Chicago Circle (779-78-5)

10:30-10:50 (140) Some results concerning the generalized axially symmetric Helmholtz (GASH) equation. Professor ROBERT F. MILLAR, University of Alberta (779-35-5)

11:00-11:20 (141) Propagation of analytic singularities along diffracted rays. JEFFREY RAUCH*, University of Michigan, Ann Arbor, and JOHANNES SJOSTRAND, Université de Paris, France (779-35-1)

11:30-11:50 (142) Finite difference schemes for conservation laws. Professor RONALD J. DIPERNA, University of Wisconsin, Madison (779-35-3)

THURSDAY, 10:00 A.M.

Invited Address, Rackham Lecture Hall
(143) The arithmetic theory of loop groups. Professor HOWARD GARLAND, Yale University (779-22-2)

THURSDAY, 10:00 A.M.

Special Session on Analytic Number Theory. II, B-115, Modern Language Building
10:00-10:20 (144) The Erdős-Kac theorem for the sieve of Eratosthenes. Professor KRISHNASWAMI ALLADI, University of Michigan, Ann Arbor (779-10-5)

10:30-10:50 (145) Prime number estimates via approximations to the Möbius function. Professor HAROLD G. DIAMOND, University of Illinois, Urbana-Champaign (779-10-22)

11:00-11:20 (146) On the proportion of zeros of Riemann's zeta-function on the critical line. Dr. BRIAN CONREY, University of Illinois, Urbana-Champaign (779-10-29)

11:30-11:50 (147) A class of extremal functions for the Fourier transform. I. Professor JEFFREY D. VAALER* and Professor S. W. GRAHAM, University of Texas, Austin (779-42-6)

12:00-12:20 (148) A class of extremal functions for the Fourier transform. II. Professor S. W. GRAHAM* and Professor JEFFREY D. VAALER, University of Texas, Austin (779-10-12)

THURSDAY, 10:00 A.M.

Special Session on Orthogonal Polynomials and Other Extremal Polynomials. III, 35 Angell Hall
10:00-10:20 (149) On orthogonal Sheffer sequences. Preliminary report. Dr. JAMES WARD BROWN, Ann Arbor, Michigan (779-33-4)

10:30-10:50 (150) Orthogonality of certain functions with respect to complex valued weights. Professor GEORGE GASPER, Northwestern University (779-33-5)

11:00-11:20 (151) On the convergence of orthogonal polynomial series with respect to general weight functions on the whole real line. Preliminary report. Professor H. N. MHASKAR, Ohio State University, Columbus (779-41-2)

11:30-11:50 (152) Inequalities for weighted polynomials on unbounded intervals. Professor R. A. ZALIK, Auburn University (779-26-1)

THURSDAY, 10:00 A.M.

Special Session on Hardy Spaces and Harmonic Analysis. I, Auditorium D, Angell Hall
10:00-10:20 (153) Composition operators isolated in the uniform operator topology. Professor EARL BERKSON, University of Illinois, Urbana-Champaign (779-30-2)

10:30-10:50 (154) Banach-space-valued martingale transforms and singular integrals. Professor D. L. BURKHOLDER, University of Illinois, Urbana-Champaign (779-46-6)

11:00-11:20 (155) Completely singular elliptic-harmonic measures. Professors L. A. CAFFARELLI and EUGENE B. FABES*, University of Minnesota, Minneapolis, and Professor CARLOS E. KENIG, Princeton University (779-35-17)

THURSDAY, 10:00 A.M.

Special Session on Stochastic Analysis. III, Auditorium C, Angell Hall

10:00-10:20  (157)  Weak compactness of probability measures associated with random equations. Preliminary report. Professor A. T. BHARUCHA-REID, Wayne State University (779-60-7)


11:15-11:35  (160)  The one-dimensional diffusion process and unitary representations of $\mathbb{R}^1$. Professor M. P. HEBLE, University of Toronto (779-43-1)

11:40-12:00 Informal discussion led by RANGACHARY KANNAN, University of Texas, Arlington

THURSDAY, 10:00 A.M.

Special Session on Applications of Mathematics to Anthropology and Sociology. III, B-116 Modern Language Building

10:00-10:20  (162)  Asymmetric matrices in dynamic balance theory. Professor J. E. HUNTER* and Mr. R. C. BELL, Michigan State University (779-92-3) (Introduced by Professor Stephen B. Seidman)

10:30-10:50  (163)  The measurement of enterprise structure. Dr. S. D. BERKOWITZ*, Dr. P. J. CARRINGTON and Dr. L. WAVERMAN, University of Toronto (779-92-7) (Introduced by Professor Stephen B. Seidman)

11:00-11:20  (164)  A temporal analysis of communication patterns in a computer conference. RONALD E. RICE, Stanford University (779-92-9) (Introduced by Professor Stephen B. Seidman)

THURSDAY, 10:30 A.M.

Special Session on Models of Arithmetic. III, 429 Mason Hall

10:30-10:50  (165)  A theorem of Rabin in a general setting. Professor ANGUS MacINTYRE, Yale University (779-03-3) (Introduced by Professor Carol Wood)

11:00-11:20  (166)  Two questions about ultrapowers of $N$. ANDREAS BLASS, University of Michigan, Ann Arbor (779-03-8)

11:30-11:50  (167)  Consistency proofs in FIN. JAN MYCIELSKI, University of Colorado, Boulder (779-03-5)

THURSDAY, 10:30 A.M.

Session on General Topology and Real Analysis. 439 Mason Hall

10:30-10:40  (168)  Absolute $\varepsilon$-embedding in functionally Hausdorff spaces. Preliminary report. CHARLES E. AULL, Virginia Polytechnic Institute and State University (779-54-1)

10:45-10:55  (169)  Sub regular refinability and subparacompactness. Professor HOWARD H. WICKE* and Professor JOHN M. WORRELL, JR., Ohio University, Athens (779-54-2)

11:00-11:10  (170)  Quasimetrics on subsets. Preliminary report. Dr. JOHN CLIVE KELLY, University of Hull, England (779-54-3)

11:15-11:25  (171)  The equivalence of the uncountably many closed sets property and the least upper bound property of the real numbers. E. H. ANDERSON* and M. J. ANDERSON, Mississippi State University (779-26-2)

11:30-11:40  (172)  Liapounoff's theorem for finitely additive measures. Professor THOMAS E. ARMSTRONG* and KAREL PRIKRY, University of Minnesota, Minneapolis (779-28-1)

11:45-11:55  (173)  Partitions for the Fubini theorem. Professor LEON W. COHEN, University of Maryland, College Park (779-28-2)

THURSDAY, 11:15 A.M.

Invited Address, Rackham Lecture Hall

11:30-11:50  (174)  Whitehead torsion old and new and its relationship with the geometric topology. Professor DAN BURGHELEA, Ohio State University, Columbus (779-55-4)
THURSDAY, 1:00 P. M.

AMS/IMS Invited Address, Rackham Lecture Hall
(175) Optimum combinatorial designs. Professor JACK C. KIEFER, University of California, Berkeley (779-62-1)

THURSDAY, 1:00 P. M.

Special Session on Univalent Functions: Recent Developments. IV, Lecture Room 2, Modern Language Building
1:00- 1:20 (176) On omitted area problem. Preliminary report. ROGER W. BARNARD*, Texas Tech University, and TED J. SUFFRIDGE, University of Kentucky (779-30-9)
1:30- 1:50 (177) Meromorphic starlike functions. Professor PAUL J. EENIGENBURG, Western Michigan University, and Professor ALBERT E. LIVINGSTON*, University of Delaware (779-30-16)
2:00- 2:20 (178) Typically real polynomials. Preliminary report. Professor TED J. SUFFRIDGE, University of Kentucky (779-30-19)
2:30- 2:50 (179) An inequality concerning functions with positive real part in an annulus. Preliminary report. Professor DAVID J. HALLENBECK, University of Delaware (779-30-10)

THURSDAY, 1:00 P. M.

General Session, B-116 Modern Language Building
1:00- 1:10 (180) Al-Biruni's proof of Heron's formula. ALI A. AL-DAFFA', University of Petroleum and Minerals, Saudi Arabia (Introduced by Professor Paul T. Bateman) (779-01-1)
1:15- 1:25 (181) On the Budan-Fourier controversy. ALKIVIADIS G. AKRITAS, University of Kansas (779-42-7) (Introduced by Professor Paul T. Bateman)
1:30- 1:40 (182) Dual pseudoalgebras for closed color systems. Preliminary report. Professor E. P. MILES, JR., Florida State University (779-00-1)
1:45- 1:55 (183) On the nine-faced space-fillers. Mr. MICHAEL GOLDBERG, Washington, D.C. (779-52-1)
2:00- 2:10 (184) Hyperspheres associated with a set of points on a hypersphere. D. VENUGOPALA RAO, Institute of Mathematics, Kerala, S. India (779-51-2) (Introduced by Dr. K. Narayanan Kutty)

THURSDAY, 1:00 P. M.

Session on Ring Theory and Matrix Theory, 439 Mason Hall
1:00- 1:10 (185) A note on semihereditary rings. Dr. ADIL G. NAOUM, University of Baghdad, Iraq (779-13-1)
1:30- 1:40 (187) Explicit solutions of the general linear matrix equation. Dr. JOHN JONES, Jr., Air Force Institute of Technology, Dayton, Ohio (779-15-1)
1:45- 1:55 (188) Classification of nondegenerate symmetric pencils under the strict orthogonal similarity. Professor SHMUEL FRIEDLAND, Mathematics Research Center, University of Wisconsin, Madison, and Hebrew University, Israel (779-15-2)
2:00- 2:10 (189) A Hurwitz matrix is totally positive. J. H. B. KEMPERMAN, University of Rochester (779-15-3)
2:15- 2:25 (190) A commutativity theorem. Dr. HAZAR ABU-KHUZAM, University of Petroleum and Minerals, Saudi Arabia (779-16-1)

THURSDAY, 1:00 P. M.

Session on Differential Equations, Auditorium C, Angell Hall
1:00- 1:10 (191) Totally singular extensions of the Cauchy problem and applications. Professor ANTOINE P. BRÉDIMAS, Université Paris, France (779-35-7)
1:30- 1:40 (193) Functional differential equations with unbounded delay in a Banach space. Dr. ROBERT J. THOMPSON, Sandia National Laboratories, Albuquerque (779-39-1)
1:45- 1:55 (194) On the existence of eigenvalues and bounded solutions of differential systems dependent on a parameter. Preliminary report. Dr. SHOSHANA ABRAMOVICH* and Professor SHLOMO STRETLITZ, University of Haifa, Israel (779-34-2) (Introduced by Victor Harnik)
2:00-2:10 (195) A limit-point criterion. Professor HERBERT KURSS*, Adelphi University, and Dr. GERALD MEYER, LaGuardia Community College (779-34-3)

THURSDAY, 1:00 P.M.

Session on Geometry and Topology, 429 Mason Hall
1:00-1:10 (196) On the volume of tubes. Preliminary report. Dr. ALLEN GORIN, Seton Hall University (779-53-1)
1:15-1:25 (197) Knot quandles a classifying knot invariant. DAVID E. JOYCE, Clark University (779-55-1)
1:30-1:40 (198) Wu-like classes for involutions and generalized Peterson-Stein classes. Preliminary report. Professor T. Y. LIN, Louisiana State University and University of South Carolina, Aiken (779-55-2)
1:45-1:55 (199) The least number of inverse images. Preliminary report. Professor BENJAMIN HALPERN, Indiana University, Bloomington (779-55-3)
2:00-2:10 (200) Homotopy pair groups. Professor K. A. HARDIE, University of Cape Town, South Africa (779-55-5)
2:15-2:25 (201) Arbitrary continuous stationary probability density functions are possible for stochastic cuspidal catastrophe models. Professor BILL WATSON, College of Charleston (779-58-1)

THURSDAY, 1:30 P.M.

Special Session on Analytic Number Theory. III, B-115 Modern Language Building
1:30-1:50 (202) On the average order of a class of arithmetical functions. Preliminary report. Dr. JAMES L. HAFNER, University of Illinois, Urbana-Champaign (779-10-6)
2:00-2:20 (203) On the estimation of exponential sums. GRIGORI KOLESNIK, University of Texas, Austin (779-10-4)
2:30-2:50 (204) Density theorems for a class of Dirichlet series. Preliminary report. DON REDMOND, Southern Illinois University (779-10-16)
3:00-3:20 (205) Chapter 3 of Ramanujan’s second notebook. Professor BRUCE C. BERNDT*, University of Illinois, Urbana, and Professor RONALD J. EVANS, University of California, San Diego (779-10-10)
3:30-3:50 (206) Simultaneous p-adic zeros of three diagonal cubic forms. Preliminary report. Professor EDIE STEVENSON, University of Colorado, Boulder (779-10-11)

THURSDAY, 1:30 P.M.

Special Session on Orthogonal Polynomials and Other Extremal Polynomials. IV, 35 Angell Hall
1:30-1:50 (207) The zero distribution of orthogonal polynomials associated with a weight function of bounded support. Preliminary report. Professor JOSEPH L. ULLMAN, University of Michigan, Ann Arbor (779-31-1)
2:00-2:20 (208) Relations between the coefficients in the recurrence formula and the spectral function for orthogonal polynomials. Dr. JEFFREY S. GERONIMO, Georgia Institute of Technology (779-33-8)
2:30-3:30 (209) Open problem session

THURSDAY, 1:30 P.M.

Special Session on Hardy Spaces and Harmonic Analysis. II, Auditorium 4, Modern Language Building
2:00-2:20 (211) Measures on the torus which are real parts of analytic functions. Preliminary report. Professor J. N. MCDONALD, Arizona State University (779-42-2)
2:30-2:50 (212) A new proof of a theorem on the area integral in the polydisc. Preliminary report. KENT G. MERRYFIELD, University of Chicago (779-42-3)
3:00-3:20 (213) H1-BMO dualities in \( C^1 \) domains. Professor EUGENE B. FABES, University of Minnesota, Minneapolis, Professor CARLOS E. KENIG, Princeton University, and Professor UMBERTO NERI*, University of Maryland, College Park (779-31-2)

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THURSDAY, 2:00 P. M.

Special Session on Codes, Groups, and Designs. II, Lecture Room 1, Modern Language Building
2:00- 2:20 (214) Voronoi regions of sphere packings. NEIL J. A. SLOANE, Bell Laboratories, Murray Hill, New Jersey (779-94-5)

2:30- 2:50 (215) Codes related to some set intersection problems. A. M. ODLYZKO, Bell Laboratories, Murray Hill, New Jersey (779-05-15)

3:00- 3:20 (216) Information sets and linear codes. Preliminary report. Professor KENNETH P. BOGART, Dartmouth College (779-05-25)

3:30- 3:50 (217) On the covering radius. Professor H. F. MATTSON, JR.*, Syracuse University, and Dr. JAMES R. SCHATZ, Columbia, Maryland (779-05-9)

THURSDAY, 2:00 P. M.

Special Session on Mathematical Methods in Wave Propagation. II, Auditorium 3, Modern Language Building
2:00- 2:20 (218) Shock development prior to detonation in a shaped layered nonlinear elastic medium with stochastic variability. Professor ALAN JEFFREY, University of Newcastle, England, and Professor ROBERT P. GILBERT*, University of Delaware (779-73-2)

2:30- 4:00 (219) Informal discussion session

THURSDAY, 2:30 P. M.

Session on Combinatorics, B-116 Modern Language Building
2:30- 2:40 (220) Shortness coefficient of cyclically 5-connected cubic planar graphs. Professor JOSEPH ZAKS, University of Haifa, Israel (779-05-26) (Introduced by Gadi Moran)


3:00- 3:10 (222) An eigenvector characterization of removal-cospectral sets of vertices. Professor ALLEN J. SCHWENK, U. S. Naval Academy (779-05-10)

3:15- 3:25 (223) Geometries admitting diagram 0|0|0. Professor ALAN P. SPRAGUE, Ohio State University, Columbus (779-05-24)

3:30- 3:40 (224) Some nonnegative determinants in inner product spaces. Professor ALEXANDER ABIAN, Iowa State University (779-05-13)

THURSDAY, 2:30 P. M.

Session on Probability, Auditorium C, Angell Hall
2:30- 2:40 (225) Distribution of symmetric stable laws of index $2^n$. SHASHANKA S. MITRA, Pennsylvania State University, DuBois (779-60-1)

2:45- 2:55 (226) Minimum-trace quasi-isometric dilations of operator-valued measures. Professor MILTON ROSENBERG, St. John’s University, New York (779-60-3)

3:00- 3:10 (227) Nonlinear stochastic system theory. Dr. GEORGE ADOMAIN, University of Georgia (779-60-6)

3:15- 3:25 (228) Inverse problems involving conditional expectations. Professor ALAN F. KARR, Johns Hopkins University (779-60-9)

THURSDAY, 4:00 P. M.

Prize Session, Rackham Lecture Hall

THURSDAY, 5:00 P. M.

Business Meeting, Rackham Lecture Hall

FRIDAY, 8:00 A. M.

Session on Partial Differential Equations, Auditorium 3, Modern Language Building
8:00- 8:10 (229) Global nonexistence of smooth electric induction fields. Preliminary report. Professor FREDERICK BLOOM, University of South Carolina, Columbia (779-35-9) (Introduced by Professor T. Markham)

8:15- 8:25 (230) N-functions and the weak comparison principle. Professor VICTOR L. SHAPIRO, University of California, Riverside (779-35-10)

8:30- 8:40 (231) Boundary value problems for the Laplacian in an exterior domain. Dr. ROBERT C. MOWEN, Northeastern University (779-35-14)

8:45- 8:55 (232) Evolution equations in a locally convex space. Preliminary report. YOUNG HAN CHOE. University of Illinois at Chicago Circle (779-35-16)
FRIDAY, 8:30 A. M.
Special Session on Analytic Number Theory. IV, B-115 Modern Language Building
8:30- 8:50 (233)  Totally symmetric plane partitions.  Professor GEORGE E. ANDREWS, Pennsylvania State University, University Park (779-10-23)  
9:00- 9:20 (234)  Identities for polynomial approximations to theta functions.  Professor D. M. BRESSOU, Pennsylvania State University, University Park (779-10-2) 
9:30- 9:50 (235)  Some problems which are equivalent to Selberg’s integral. Dr. KEVIN W. J. KADELL, University of Wisconsin, Madison (779-10-18) 

FRIDAY, 8:45 A. M.
Colloquium Lectures, Lecture IV, Rackham Lecture Hall (236)  Between logic and arithmetic: Nonstandard models of arithmetic.  Professor JULIA B. ROBINSON, University of California, Berkeley 

FRIDAY, 9:00 A. M.
Special Session on Codes, Groups, and Designs. III, Lecture Room 1, Modern Language Building
9:00- 9:20 (237)  Quasicyclic codes.  Preliminary report.  Dr. DONALD Y. GOLDBERG, Occidental College (779-94-2) 
9:30- 9:50 (238)  Multiplying vectors in binary quadratic residue codes.  ROBERT CALDERBANK* and DAVID B. WALES, California Institute of Technology (779-94-3) 
10:00-10:20 (239)  Automorphisms of binary codes.  Preliminary report.  Dr. W. CARY HUFFMAN, Loyola University, Chicago (779-05-4) 
10:30-10:50 (240)  Divisible codes.  Professor HAROLD N. WARD, University of Virginia (779-05-11) 
11:00-11:20 (241)  The hexacode, the Golay code, and the MOG.  Preliminary report.  Professor J. H. CONWAY, DPMMS, Cambridge, England (779-05-1) (Introduced by Professor Vera S. Pless) 

FRIDAY, 9:00 A. M.
Special Session on Hardy Spaces and Harmonic Analysis. III, Auditorium 4, Modern Language Building
9:00- 9:20 (242)  Decomposition theorems for trace class Hankel operators.  Preliminary report.  Professor R. R. COIFMAN and Professor R. ROCHBERG*, Washington University, St. Louis (779-47-3) 
9:30- 9:50 (243)  The maximal ideal space of $H^p$.  DONALD SARASON, University of California, Berkeley (779-30-12) 
10:00-10:20 (244)  Fourier transforms of HP spaces.  Preliminary report.  Professor ALBERT BAERNSTEIN, Washington University, and Professor ERIC T. SAWYER*, McMaster University (779-42-8) 
10:30-10:50 (245)  A geometric characterization of analytic functions with bounded mean oscillation.  Preliminary report.  Professor DAVID A. STEGENGA*, University of Hawaii, Honolulu, and Professor KENNETH STEPHENSON, University of Tennessee, Knoxville (779-30-25) 

FRIDAY, 9:00 A. M.
Special Session on Mathematical Methods in Wave Propagation. III, Auditorium 3, Modern Language Building
9:00- 9:20 (246)  Scattering by moving obstacles.  Preliminary report.  Professor JEFFERY COOPER*, University of Maryland, College Park, and Professor WALTER STRAUSS, Brown University (779-35-6) 
9:30- 9:50 (247)  The asymptotics of high frequency wave propagation in nonhomogeneous media with radiating boundaries.  Preliminary report.  Professor CLIFFORD O. BLOOM, SUNY at Buffalo (779-78-4) 
10:30-10:50 (249)  Spectral properties of operators arising in acoustic wave propagation in an ocean with variable depth.  Professor WALTER LITTMAN, University of Minnesota, Minneapolis (779-35-13) 
11:00-11:20 (250)  A method for solving the Helmholtz equation.  CATHLEEN SYNGE MORAWETZ, Courant Institute of Mathematical Sciences, New York University (779-65-1)
11:30-11:50 (251) Inverse problem for the reduced wave equation with fixed incident wave. Professor VAUGHAN H. WESTON, Purdue University, West Lafayette (779-35-4)

FRIDAY, 9:15 A. M.

Session on Classical Analysis, 35 Angell Hall
9:15- 9:25 (252) Conformal mappings onto domains with arbitrarily specified boundary shapes. Preliminary report. Dr. ANDREW N. HARRINGTON, Georgia Institute of Technology (779-30-4) (Introduced by Dr. Les A. Karlovitz)
9:30- 9:40 (253) Inequalities between Bergman spaces. Preliminary report. Dr. DANIEL H. LUECKING, Michigan State University (779-30-23)
9:45- 9:55 (254) Lipschitz conditions, b-arcwise connectedness and conformal mappings. Preliminary report. RAIMO NÄKKI and Professor BRUCE PALKA*, University of Texas, Austin (779-30-24)

10:00-10:10 (255) Total positivity of mean values and hypergeometric functions. Professor B. C. CARLSON, Ames Laboratory-DOE, Iowa State University (779-41-5)
10:15-10:25 (256) Some remarks on linear selections of best approximation. Preliminary report. ROBERT SINE, University of Rhode Island, Kingston (779-41-5)
10:30-10:40 (257) On a Heaviside theorem for irreducible quadratic factors of order n. Preliminary report. Professor SADANAND VERMA, University of Nevada, Las Vegas (779-44-1) (Introduced by Professor L. J. Simonoff)
10:45-10:55 (258) Two unpublished tables for obtaining Chebyshev approximations. Dr. HERBERT E. SALZER, Brooklyn, New York (779-65-2)

FRIDAY, 10:00 A. M.

Invited Address, Rackham Lecture Hall
(259) Sieves and combinatorial inequalities: From Eratosthenes to Chen. Professor HEINI HALBERSTAM, University of Illinois, Urbana-Champaign (779-10-15)

FRIDAY, 10:00 A. M.

Special Session on Topos Theory. I, Lecture Room 2, Modern Language Building
10:00-10:20 (260) Quotients of decidable objects in a topos. Preliminary report. Dr. PETER T. JOHNSTONE, University of Cambridge, England (779-18-1)
10:30-10:50 (261) The topos of "recursive" sets. Preliminary report. PHILIP S. MULRY, SUNY, Buffalo (779-18-2)
11:00-11:20 (262) Intuitionist type theory and the free topos. J. LAMBEK* and P. J. SCOTT, McGill University (779-18-5)

FRIDAY, 10:00 A. M.

Session on Logic, Set Theory, and Computer Science, B-116 Modern Language Building
10:00-10:10 (263) Minimal $\omega$-models of $\Sigma^1_1$-BI do not exist. Preliminary report. Dr. JOSEPH E. QUINSEY, St. Catherine's College, England (779-03-6)
10:15-10:25 (264) Modular machines—a new tool for decision problems. DANIEL E. COHEN, Queen Mary College, London, England (779-03-7) (Introduced by Professor Paul T. Bateman)
10:30-10:40 (265) On the Borel class of the derived set operator. Preliminary report. Professor DOUGLAS CENZER, University of Florida, Gainesville (779-04-1)
10:45-10:55 (266) Elementary equivalents of the continuum hypothesis. HARVEY FOX, University of Wisconsin Center, Waukesha County (779-04-2)
11:00-11:10 (267) An arithmetical characterisation of NP. C. F. KENT*, Lakehead University, and B. R. HODGSON, Université Laval (779-68-2)
11:15-11:25 (268) Experiments with computer implementations of procedures which often derive decision algorithms for the word problem in abstract algebras. Dr. GEORGE BUTLER and Dr. DALLAS LANKFORD*, Louisiana Tech University (779-68-3)
11:30-11:40 (269) Leontief languages, models of input-output systems. Dr. AURORA BACIU* and Dr. ANCA PASCU, Academy Stefan Gheorghiu, Romania (779-68-7) (Introduced by Professor Paul T. Bateman)
Understanding the inconsistency of axiomatic set theories (such as ZFC).
Dr. GERHARD F. KOHLMAYR, Mathmodel Consulting Bureau, Glastonbury, Connecticut (779-03-11)

FRIDAY, 11:15 A. M.

Invited Address, Rackham Lecture Hall
The norm preserving lifting of intertwining of vectors and its applications.
Professor CIPRIAN FOIAS, Indiana University, Bloomington, and Université Paris-Sud, France (779-47-7)

FRIDAY, 12:30 P. M.

Special Session on Analytic Number Theory. V, B-115 Modern Language Building
Modular equations suitable for ring class field theory. Professor HARVEY COHN, CUNY, City College (779-10-8)
Zero coefficients for modular forms. Professor MARVIN I. KNOPP, Temple University (779-10-21)
On the Poincaré theta operator for Fuchsian groups. Preliminary report. Professor L. A. PARSON*, Ohio State University, and Professor MARK SHEINGORN, Baruch College, CUNY (779-10-24)
Best simultaneous Diophantine approximations. III, Approximations to a basis of a nontotally real cubic field. Dr. JEFFREY C. LAGARIAS, Bell Laboratories, Murray Hill, New Jersey (779-10-25)
Infinitely integer valued polynomials over algebraic number fields. Professor K. ROGERS* and Professor ERNST G. STRAUS, University of California, Los Angeles (779-12-7)

FRIDAY, 1:00 P. M.

Special Session on Topos Theory. II, Lecture Room 2, Modern Language Building
Finite G-sets, small additive categories, and equivariant stable homotopy theory. Preliminary report. Dr. L. GAUNCE LEWIS, JR., University of Michigan, Ann Arbor (779-18-4)
Topos theory and analysis. JON M. BECK, University of Puerto Rice (779-18-3)
Galois closure of paths and functions in the topos of flat spaces and in the topos of smooth spaces. Professor F. WILLIAM LAWVERE, SUNY, Buffalo (779-51-4)

FRIDAY, 1:00 P. M.

Special Session on Codes, Groups, and Designs. IV, Lecture Room 1, Modern Language Building
A decoding method for some binary self-dual codes. Preliminary report. Professor PAUL CAMION, Centre National de la Recherche Scientifique, France (779-94-6)
(Introduced by Professor Vera Pless)
Better Reed-Solomon encoders. Professor ELWYN R. BERLEKAMP, University of California, Berkeley (779-94-1)
23 does not divide the order of the group of a (72, 36, 16) doubly-even code. Professor VERA PLESS, University of Illinois at Chicago Circle (779-05-6)
Problem session moderated by Vera S. Pless
FRIDAY, 1:00 P. M.
Special Session on Mathematical Methods in Wave Propagation. IV, Auditorium 3, Modern Language Building
1:00- 1:20 (290) An integral equation for eddy current problems. SUBRAMANIYA HARIHARAN and Professor RICHARD C. MacCAMY*, Carnegie-Mellon University (779-45-1)
1:30- 1:50 (291) Many body wave scattering. Professor A. G. RAMM, University of Michigan, Ann Arbor (779-78-1)
2:00- 2:20 (292) Optimal control of the exterior Robin problem for the Helmholtz equation. Preliminary report. Dr. ANDREAS KIRSCH, University of Göttingen, West Germany (779-35-2) (Introduced by Professor David L. Colton)
2:30- 2:50 (293) The response of penetrable bodies to electromagnetic pulses. Preliminary report. Dr. DAVID K. COHOON, School of Aerospace Medicine, San Antonio (779-78-6)

Paul T. Bateman
Associate Secretary
LECTURES IN APPLIED MATHEMATICS

NONLINEAR OSCILLATIONS IN BIOLOGY

edited by Frank C. Hoppensteadt

This seminar, sponsored jointly by the American Mathematical Society and the Society for Industrial and Applied Mathematics, was held at the University of Utah from June 12 to June 23, 1978, and intended as an introduction to the theory and methods of nonlinear oscillations and how they are used to study oscillatory phenomena in the life sciences. A core series of lectures by L. N. Howard, in-depth case studies by A. S. Winfree and C. Steele and background lectures on mathematical topics by J. Guckenheimer, J. K. Hale, F. C. Hoppensteadt, D. Ludwig and O. E. Rössler are reproduced in these proceedings. Additional lectures on cell metabolism, population dynamics, perturbation theory, neural sciences, epidemiology and reaction-diffusion systems were given but without written record. The program for the seminar was organized by W. S. Childress (Courant Institute of Mathematical Sciences, New York University), D. S. Cohen (California Institute of Technology), F. C. Hoppensteadt (University of Utah), P. Waltman (University of Iowa), and A. S. Winfree (Purdue University).

This book is an unusual and useful collection of applied and theoretical articles geared toward introducing the reader to a wide variety of methods in nonlinear oscillations. It will be of interest to applied mathematicians, bioengineers, and biophysicists who have a background of undergraduate mathematics (calculus, differential equations), and some graduate mathematics (diffusion processes, fluid mechanics). It contains summaries of some recent applications of nonlinear oscillations methods in life sciences. The papers are directed at introducing mathematically adept scientists to recent methods and results.

Volume 17, x + 253 pages
List price $29.20, institutional member $21.90, individual member $14.60
ISBN 0-8218-1117-7; LC 79-26469
Publication date: November 1979
To order, please specify LAM/17H

Prepayment is required for all American Mathematical Society publications.

Send for the book(s) above to: AMS, P.O. Box 1571, Annex Station, Providence, RI 02901

Invited Speakers at AMS Meetings

The individuals listed below have accepted invitations to address the Society at the times and places indicated. For some meetings, the list of speakers is incomplete.

Providence, Rhode Island, October 1980

Goro Azumaya
William E. Fulton

Kenosha, Wisconsin, October-November 1980

Igor Dolgachev
Stephen C. Kleene

Knoxville, Tennessee, November 1980

Frank Quinn
David G. Schaeffer

San Francisco, California, January 1981

Shmuel Agmon
Gregory V. Chudnovsky
Roger Keith Dennis
Feza Gursey
James E. Humphreys
Mark Kac
(Colloquium Lectures)

Peter D. Lax
(Reiring Presidential Address)
Cathleen S. Morawetz
(Gibbs Lecture)
Masamichi Takesaki
Michele Vergne
The seven hundred eightieth meeting of the American Mathematical Society will be held at Brown University, Providence, Rhode Island, on Saturday and Sunday, October 18-19, 1980. All sessions will be held in Barus-Holley Building.

PLEASE NOTE: Because there are no convenient transportation, housing, or food facilities available for participants, the Society and the mathematics department at the University of Connecticut have agreed not to hold the 780th meeting at Storrs as was originally planned. The meeting has been relocated to Providence, and the dates have also been changed from October 17-18.

Invited Addresses
By invitation of the Committee to Select Hour Speakers for Eastern Sectional Meetings, there will be four invited one-hour addresses. The speakers are GORO AZUMAYA, Indiana University, Bloomington; WILLIAM E. FULTON, Brown University; R. B. MELROSE, Massachusetts Institute of Technology; and MICHAEL C. REED, Duke University. The titles of their lectures will be announced in the October issue of the Notices.

Special Sessions
By invitation of the same committee, there will be eight special sessions of selected twenty-minute papers:

**Harmonic analysis**, RON C. BLEI and STUART J. SIDNEY, University of Connecticut, Storrs. The list of speakers is not yet available.

**History and philosophy of mathematics**, ROGER LEE COOKE, University of Vermont. The speakers include Raymond Ayoub, Lee Bowie, Michael Jubien, V. F. Rickey, Stanley Stahl, Thomas Tymoczko, and Michael Zemben.

**Representations of Lie groups**, ANTHONY W. KNAPP, Cornell University. The speakers will be Brian Blank, R. A. Herb, Roger Howe, Bertram Kostant, Wulf Rossman, Diana Shelstad, Brigit Sveh, Elias Stein, Michele Vergne, David Hogan, Nolan Wallach, and Gregg Zuckerman.


**Algebra of analytic functions**, CHARLES E. RICKART, Yale University. The speakers will be announced in the October Notices.


Scientific computing and numerical analysis, MARTIN H. SCHULTZ, Yale University. The speakers will be announced in the October Notices.

Papers presented at these special sessions are generally by invitation of the organizers. However, anyone contributing an abstract for the meeting who feels that his or her paper would be appropriate for one of the special sessions should indicate this clearly on the abstract and submit it by July 31, 1980, three weeks before the normal deadline for contributed papers.

Contributed Papers
There will also be sessions for contributed ten-minute papers. Abstracts should be prepared on the standard AMS form available from the AMS office in Providence or in departments of mathematics, and should be sent to the American Mathematical Society, P. O. Box 6248, Providence, Rhode Island 02940, so as to arrive by the deadline of August 21.

Registration
The registration desk will be located in the lobby of the Barus-Holley Building, where participants may register from 8:30 a.m. until 4:00 p.m. on Saturday, and 8:30 a.m. until 2:00 p.m. on Sunday. Registration fees for the meeting are $3 for members of the Society, $5 for nonmembers, and $1 for students or unemployed mathematicians.

Accommodations
Blocks of rooms have been set aside for participants in the following hotels or motels; all, except the Howard Johnson's Motor Lodge, are located in or close to downtown Providence. Participants should make reservations directly with the hotel or motel and should mention the AMS meeting, so as to obtain the special rates. All rates quoted are subject to the 6 percent R.I. sales tax. The deadline for these reservations is September 26. The following codes apply: FP-free parking; SP-swimming pool; AC-air conditioned; TV-television; CL-cocktail lounge; RT-restaurant.

*Biltmore Plaza* (1.3 miles, 30-minute walk)
Kennedy Plaza, 02903
Telephone: 401-421-0700
Single $43
Double or Twin $53
Codes: FP-AC-TV-CL-RT

*Holiday Inn* (1.5 miles, 36-minute walk)
21 Atwells Avenue, 02903
Telephone: 401-831-3900
Single $35
Double or Twin $42
Codes: FP-SP-AC-TV-CL-RT

Telephone: 401-831-3900
Single $35
Double or Twin $42
Codes: FP-SP-AC-TV-CL-RT
*Howard Johnson’s Motor Lodge (6.4 miles)  
20 Jefferson Boulevard, Warwick, 02888  
Telephone: 401-467-9800

Single $31  Double $37  Twin $39  
Codes: FP-SP-AC-TV-CL-RT

Marriott Inn Providence (1.3 miles, 30-minute walk)  
Charles and Orms Streets, 02904  
Telephone: 401-272-2400

Single $42  Double or Twin $48  
Codes: FP-SP-AC-TV-CL-RT

Wayland Manor (0.75 mile, 15-minute walk)  
500 Angell Street, 02906  
Telephone: 401-751-7700

Single $29  Double or Twin $37  
Codes: FP-TV-CL-RT (lunch and dinner only)

*These facilities provide courtesy transportation from the T. F. Greene Airport by advance request. There is also limousine service from the airport to downtown motels (see Transportation section below).

Food Service

Meals will be available on a cash basis in the Sharpe Refectory, located at the corner of George and Thayer Streets, on both Saturday and Sunday. In addition, there are many restaurants within a short walk from Barus-Holley, as well as in downtown Providence and the surrounding area.

Transportation

Theodore Francis Greene Airport, located in Warwick, is served by several major airlines including Eastern, TWA, United, and USAir, as well as commuter carriers, and is approximately fifteen minutes from downtown Providence. The Aero Airport Limousine Service meets incoming flights, and the charge for one-way transportation to downtown Providence is currently $5.75 per person. The average charge for taxicabs is approximately $14.

Providence is also served by regularly scheduled Amtrak trains from Boston, New York City, and Washington, D.C. Union Station is in the center of downtown Providence, and it is only a few minutes’ ride to the campus by taxi. The bus terminal is located near Union Station, and frequent bus service is provided to or from Boston, Boston’s Logan Airport, and New York City.

Persons driving from the T. F. Greene Airport or points south of Providence to the Brown campus should follow I-95 north to Providence, and take the exit marked “I-95 East.” Take the first exit off I-95 (marked “Downtown”), turn right at the end of the ramp and left on South Main Street. Turn right up the hill on College Street to Prospect Street, right again on Prospect Street, and then left on George Street. The parking lot of Barus-Holley Building is at the corner of George and Hope Streets. To reach the Holiday Inn or Biltmore Plaza, those driving from the south should not exit on I-95, but stay on I-95 north to the Broadway exit (#21). To reach the Marriott Inn, stay on I-95 until the State Offices exit (#23) and turn left at the top of the ramp onto Orms Street.

Participants driving to Providence from the north on I-95 would take the exit marked “I-95 East” and then follow the same directions to reach the campus from route I-195. To reach the Marriott Inn, take exit 23 (marked “Charles Street” at the first sign, and “State Offices” at the next sign). Charles Street is one-way, so traffic must bear right and take the first available left to go back under Route 1-95. The Marriott is a short distance away on the right. To go to the Holiday Inn or Biltmore Plaza, take the Atwells Avenue/Downtown exit (#21) and turn left at the traffic light at the top of the ramp.

Participants attending the meeting may park in the lot next to Barus-Holley Building.

There is frequent local bus service from downtown Providence to Hope Street, for which exact change of 35¢ is required each way. Fall schedules are not yet available, so anyone planning to take the bus is advised to call the Rhode Island Public Transit Authority at 781-9400 to obtain information at the time of the meeting.

Raymond G. Ayoub  
University Park, Pennsylvania  Associate Secretary
Second Announcement of the 781st Meeting

The seven hundred eighty-first meeting of the American Mathematical Society will be held at the University of Wisconsin-Parkside, Kenosha, Wisconsin, on Friday, October 31, and Saturday, November 1, 1980. All sessions will be held in the Parkside Union or in Molinaro Hall, the adjoining classroom building. Kenosha is located on Lake Michigan about ten kilometers north of the Illinois-Wisconsin state line. (Wisconsin, unlike Illinois, has ratified the Equal Rights Amendment.)

Invited Addresses

By invitation of the 1979 Committee to Select Hour Speakers for Western Sectional Meetings, there will be four invited one-hour addresses.

IGOR DOLGACHEV, University of Michigan, Ann Arbor, will address the Society at 11:00 a.m. on Friday; his topic is Toric varieties and their applications.

STEPHEN C. KLEENE, University of Wisconsin, Madison, will give an hour talk at 1:45 p.m. on Friday on The theory of recursive functions, approaching its centennial.

VERA S. PLESS, University of Illinois at Chicago Circle, will speak at 11:00 a.m. on Saturday; her topic is Main problems in error-correcting codes.

PETER B. SHALEN, Rice University, will address the Society at 1:45 p.m. on Saturday; his subject will be Three-manifolds, linear groups, and algebraic varieties.

All four one-hour addresses will be given in the Cinema Theater in the Parkside Union.

Special Sessions

By invitation of the same committee there will be five special sessions of selected twenty-minute papers. The topics of these special sessions and their organizers are:


- Ordinary differential equations in the complex domain, DONALD A. LUTZ, University of Wisconsin, Milwaukee. The tentative list of speakers includes Steven B. Bank, Louis J. Grimm, L. M. Hall, William A. Harris, Jr., Po-Fang Hsieh, Yasutaka Sibuya, and Wolfgang R. Wasow.

- Commutative algebra and algebraic geometry, JOEL L. ROBERTS, University of Minnesota, Minneapolis. The tentative list of speakers includes Kaan U. Akin, John A. Eagon, Melvin Hochster, Craig L. Huneke, William E. Lang, Tzuong-Tsieng Moh, Kenneth R. Mount, M. Pavaman Murthy, Robert Speiser, and Jacob Towber.


Most of the papers to be presented at these special sessions will be by invitation. However, anyone submitting an abstract for the meeting who feels that his or her paper would be particularly appropriate for one of these special sessions should indicate this clearly on the abstract and submit it by August 4, 1980, three weeks before the normal deadline for contributed papers.

Contributed Papers

There will be sessions for contributed ten-minute papers as needed. The abstract deadline is August 25, 1980, one week before Labor Day.

Registration

The registration desk will be located on the ground floor of the Parkside Union just outside the Cinema Theater, and will be open from approximately 8:30 a.m. to 4:30 p.m. on Friday and from 8:00 a.m. to 3:00 p.m. on Saturday. The registration fees will be $5 for nonmembers, $3 for members, and $1 for students and unemployed mathematicians.

Accommodations

A block of rooms has been reserved at the Holiday Inn. Participants should make their own reservations directly with the motel at least two weeks prior to the meeting.

Holiday Inn

5125 Sixth Avenue, Kenosha, Wisconsin 53140
Telephone: 414-658-3281

Single $32 plus tax Double $37 plus tax

These are special rates and the AMS meeting must be mentioned in order to obtain them. The University of Wisconsin, Parkside, will provide shuttle service between the Holiday Inn and the campus. The Holiday Inn overlooks Kenosha Harbor in downtown Kenosha, while the campus is five kilometers to the north.
Food Service

The Parkside Union will be open for food service Friday, with breakfast and lunch served in the main cafeteria until 2:00 p.m. The Union cafeteria will also be open to meeting participants for Saturday lunch, for which tickets should be purchased in advance at the registration desk. In addition to the restaurant in the Holiday Inn, there are a number of other nearby restaurants in Kenosha.

Parking

Visitor parking is available with a 25¢ permit on Friday in the Tallent Hall lot east of the main campus. Permits can be purchased in the Tallent Hall security office. The Union parking lot will be open Saturday for visitor parking without a permit.

Travel and Local Information

Kenosha is about 100 kilometers north of Chicago and about 60 kilometers south of Milwaukee. To reach the University from Interstate 94 go eastbound on County Highway E (which is about 15 kilometers north of the Illinois-Wisconsin state line) to County Highway G (also knows as 30th Avenue or Wood Road). Go north one kilometer on Highway G. Access to the Union parking lot is by the second road to the left, while the Tallent Hall parking lot is on the right. To reach the Holiday Inn from Interstate 94 go eastbound on State Route 158 as far as one can go.

There is direct bus service from O'Hare Airport in Chicago to Howard Johnson's Motor Lodge in Kenosha, which is located off Interstate 94, but is unfortunately somewhat distant from the campus and the Holiday Inn. The University of Wisconsin, Parkside, will provide transportation from Howard Johnson's to the Holiday Inn. Those wishing to use this service should write in advance to Timothy V. Fossum, Department of Mathematics, University of Wisconsin-Parkside, Kenosha, Wisconsin 53141, and inform him of the bus on which they expect to arrive. On weekdays buses leave O'Hare Airport at 8:10 a.m., 10:15 a.m., 12:30 p.m., and 9:15 p.m. and arrive at Howard Johnson's about an hour later; the buses are marked "Milwaukee" and leave from the lower level of Carson's Rotunda at O'Hare. Last-minute information can be obtained by calling Continental Air Transport 312-454-7800. The current bus fare is $7 one-way. Some participants may prefer to rent a car at O'Hare Airport. (It is generally inadvisable to use one of the unauthorized "gypsy" limousine services.)

There is also direct bus service from General Mitchell Airport in Milwaukee to Kenosha; buses leave Mitchell Field at 8:15 a.m. and 4:00 p.m. Those traveling by way of Milwaukee should also write to Professor Fossum, who may be able to make special arrangements for ground transportation.

Entertainment

Plans are under way for a party for all participants on Friday evening at the Holiday Inn. The cost and other details will be announced later.

Knoxville, November 14–15, 1980, University of Tennessee

First Announcement of the 782nd Meeting

The seven hundred eighty-second meeting of the American Mathematical Society will be held at the University of Tennessee, Knoxville, from noon Friday to 5:00 p.m. Saturday, November 14 and 15, 1980. Sessions will be held in the University Center, Cumberland Avenue and Stadium Drive.

Invited Addresses

By invitation of the Committee to Select Hour Speakers for Southeastern Sectional Meetings there will be three invited one-hour addresses. The speakers and titles of their talks are:

FRANK QUINN, Virginia Polytechnic Institute and State University, The topological characterization of manifolds.

DAVID G. SCHAEFFER, Duke University, Qualitative analysis of the Taylor problem in a finite cylinder via singularity theory.

DON ZAGIER, University of Maryland and Universität Bonn, Special values of L series attached to modular forms.

Special Sessions

By invitation of the same committee, there will be three special sessions of twenty-minute papers.

The topics of these special sessions and their organizers are:

Free boundary problems and variational inequalities, LAWRENCE EVANS, University of Kentucky, Lexington. Geometric topology, STEVEN C. FERRY, University of Kentucky, Lexington. Number theory, CARL POMERANCE, University of Georgia, Athens. Most of the papers to be presented at these special sessions will be by invitation; however, anyone contributing an abstract for the meeting who feels that his or her paper would be particularly appropriate for one of these sessions should indicate this clearly on the abstract. The abstract should be submitted by August 29, 1980, three weeks earlier than the normal deadline for contributed papers, in order that it may be considered for inclusion.

Contributed Papers

There will be sessions for contributed ten-minute papers. Abstracts should be submitted to the American Mathematical Society, P. O. Box 6248, Providence, Rhode Island 02940, so as to arrive prior to

Paul T. Bateman
Urbana, Illinois
Associate Secretary
the deadline of September 19. If necessary, late papers will be accepted for presentation, but will not be listed in the printed program of the meeting.

Registration

The registration desk will be in Room 329 of the University Center, and will be open from 10:00 a.m. to 4:00 p.m. on Friday, November 14, and from 8:30 a.m. to noon on Saturday, November 15. The registration fees for the meeting will be $5 for nonmembers, $3 for members of the American Mathematical Society, and $1 for students or unemployed persons.

Accommodations

Although accommodations are available at several local motels within walking distance of the meeting, blocks of rooms have been set aside at the following locations. Participants should make their own reservations directly with the motels, and identify themselves as participants in the AMS meeting. Reservations for these rooms must be received no later than October 15, 1980.

Sheraton Campus Inn (0.3 mile)
1706 Cumberland Avenue, S.W.
Telephone: 615-524-4681
- Single $22  Double $27
- $6 per additional person

University Travel Inn (0.4 mile)
1700 Clinch Avenue, S.W.
Telephone: 615-546-5974
- Single $19 plus tax—U.T. Student Rates
- Double $26 plus tax
- $5 per additional person

Holiday Inn (1 mile)
621 Dale Avenue
Telephone: 615-525-5371
- Single $22  Double $29
- $4 per additional person

Organizers and Topics of Special Sessions

Names of organizers of special sessions to be held at meetings of the Society are listed below, along with the topic of the session. Most of the papers presented at special sessions are by invitation. Other papers will be considered at the request of the author provided that this is indicated clearly on the abstract form and it is submitted by the deadlines given below. These deadlines are usually three weeks earlier than the normal abstract deadlines for meetings. Papers not selected for special sessions will automatically be considered for regular sessions unless the author gives specific instructions to the contrary.

October Meeting in Providence
Deadline: July 31
Ron C. Blei and Stuart J. Sidney
Harmonic analysis
Roger Lee Cooke
History and philosophy of mathematics

Holiday Inn (1 mile)
Downtown Chapman Highway
Telephone: 615-573-1921
- Single $25  Double $34
- $4 per additional person

Hyatt Regency Knoxville (1.5 miles)
500 E. Hill Avenue
Telephone: 615-637-1234
- Single $41  Double $41

Weather

The average mean temperature during the month of November is 60.9°F. The average rainfall for the month of November is 2.67 inches, and the probable percent of sunshine is 60%.

Food Service and Entertainment

Food service is available in the University Center and in each motel listed. Numerous fast food places are located adjacent to the campus on Cumberland Avenue. A list of restaurants and their locations will be available at the registration desk. Refreshments will also be available throughout the meeting.

A beer party is planned for Friday evening.

Travel

Knoxville is located in eastern Tennessee and is served by a major airport, as well as Greyhound and Trailway bus lines. Limousine service is available from the airport to the University campus and costs $7 per person. Knoxville is accessible by automobile via Interstates I-40 and I-75; exits to the University are clearly marked. Parking facilities on campus will be arranged.

Emergency Messages

Messages may be left at the office of the Department of Mathematics 615-974-2462.

New Orleans, Louisiana  Frank T. Birtel
Associate Secretary
Donald A. Lutz  
Ordinary differential equations in the complex domain

Joel L. Roberts  
Commutative algebra and algebraic geometry

Robert I. Soare  
Recursion theory

Norbert J. Wielenberg  
Discrete groups and low-dimensional topology

November Meeting in Knoxville
Deadline: August 29

Lawrence Evans  
Free boundary problems and variational inequalities

Steven C. Ferry  
Geometric topology

Carl Pomerance  
Number theory

January 1981 Meeting in San Francisco
Deadline: October 1

Gary Chartrand and Arthur T. White  
Graph theory

Frederick R. Cohen  
Homotopy theory

M. Deza and Ronald L. Graham  
$L_1$ and related metric spaces

Donald W. Dubois  
Ordered fields and real algebraic geometry

Richard S. Elman  
Quadratic form theory

Garret J. Etgen and Kurt Kreith  
Qualitative theory of differential equations

Robert P. Gilbert  
Elliptic systems in the plane

Morris W. Hirsch  
Geometric structures on manifolds

Joel L. Lebowitz  
Mathematical physics

S. J. Lomonaco, Jr.  
Low dimensional topology

Melvyn B. Nathanson  
Number theory

Roy Ryden and Hank Tropp  
History of contemporary mathematics

Arthur Schlissel  
History of mathematics

Glenn E. Schober  
Complex variables

Alexander P. Stone  
Differential geometry and global analysis

Special sessions at Annual and Summer meetings are held under the general supervision of the Program Committee. They are administered by the Associate Secretary in charge of the meeting with staff assistance from the Society office in Providence.

Some special sessions arise from an invitation to a proposed organizer issued through the Associate Secretary. Others are spontaneously proposed by interested organizers or participants. Such proposals are welcome. They may be submitted to the Associate Secretary, to the Chairman of the Program Committee, or to the Secretary, who is a member of the Program Committee. Beginning with the Summer Meeting of 1981, the number of special sessions at a Summer or Annual Meeting is limited to twelve. Proposals, invited or offered, which are received at least eight months prior to the meeting are screened for suitability of the topic and of the proposed list of speakers and for possible overlap or conflict with other proposals. If necessary, the numerical limitation is enforced. Later proposals, within the numerical limit, are accepted if convenience allows.

Special sessions are effective at regional meetings and can usually be accommodated. They are arranged by the Associate Secretary under the supervision of the Committee to invite Hour Speakers for the region. The limitation on the number of sessions depends on the space and time available.

No person is entitled to present more than one paper in the special sessions at any one meeting.

The Associate Secretary who will be in charge of the AMS program at the Summer Meeting in Pittsburgh, August 1981, is Frank T. Birtel. The programs of regional meetings are arranged by the Associate Secretary of the region in question: Far Western Region (Pacific and Mountain), Kenneth A. Ross; Western Region (Midwest), Paul T. Bateman; Northeastern Region, Raymond G. Ayoub; Southeastern Region, Frank T. Birtel.
REVIEWS IN GRAPH THEORY

Compiled and Edited by William G. Brown
McGILL UNIVERSITY
DEPARTMENT OF MATHEMATICS

This publication is a four-volume compendium of about 9,600 reviews in graph theory published by Mathematical Reviews in Volumes 1 through 56, i.e. between 1940 and 1978 inclusive. Reviews were selected from the several sections of Mathematical Reviews which were the usual repositories of such items; from the subject lists in Mathematical Reviews indexes, where available; and through a systematic perusal of about half of all reviews published by Mathematical Reviews during the 39 years under investigation. Every review cited in a selected review was also read, and the process iterated until stable.

A classification scheme containing over 500 categories was developed for the purpose. Every review has been assigned one primary classification and, on the average, one secondary classification. Reviews are reprinted in strict chronological order of Mathematical Review numbers in their primary subject area, with a brief citation at each secondary location.

The final volume provides a detailed author index, which can serve as an effective bibliography of the subject.

These volumes are a research tool. They are directed to anyone who has occasion to consult the literature of graph theory: mathematicians, computer scientists, engineers, and management scientists, as well as students, teachers, and practicing researchers.

The potential reader requires no more background than would be required to read papers which are reviewed in the compendium. These vary from highly erudite papers in other areas of mathematics where graph theory is used as a tool to solve specific problems, to elementary descriptive papers which would be understandable to high school students.

A few of the reviews are themselves gems of the mathematical literature. But, for the most part, the reader will use this book as a research tool—to determine what has been done in a particular area of the subject, or to locate known papers when the values of not all parameters are available.

There has been nothing of this scope or magnitude in the subject before. This is the first major bibliography in graph theory which incorporates reviews.

The editor's previous work includes research papers in graph theory and related fields, and many reviews.

It is estimated that Reviews in Graph Theory will be 2,156 pages. Publication is scheduled for December 1980. For prices call or write the Sales Department of the Society after December 1.

American Mathematical Society, P.O. Box 6248, Providence, RI 02940 (401) 272-9500
ELECTION INFORMATION

The ballots for election of members of the Council and Board of Trustees of the Society for 1981 will be mailed on or shortly after August 25, in order for members to receive their ballots well in advance of the November 10 deadline. Prior to casting their ballots members are urged to consult the following articles and sections of the Bylaws of the Society: article I, section 1; article II, sections 1, 2; article III, sections 1, 2, 3, 4; article IV, sections 1, 2, 4; article VII, sections 1, 2. The complete text of the Bylaws appears on pages 493-496 of the November 1979 issue of the Notices. A list of the members of the Council and Board of Trustees serving terms during 1980 appears on page 470 of this issue.

SUGGESTIONS FOR 1981 NOMINATIONS

Each year the members of the Society are given the opportunity to propose for nomination the names of those individuals they deem both qualified and responsive to their views and needs as part of the mathematical community. Candidates will be nominated by the Council to fill positions on the Council and Board of Trustees to replace those whose terms expire December 31, 1981. See page 470 of this issue for the list of current members of the Council and Board of Trustees. Members are requested to write their suggestions for such candidates in the appropriate spaces on the form on the next page.

REPLACEMENT BALLOTS

Ballots for the annual AMS election will be mailed on August 25, 1980 or within a day or two thereafter. The deadline for receipt of ballots in Providence is November 10, 1980.

There has been a small but recurring and distressing problem concerning members who state that they have not received ballots in the annual election. It occurs for several reasons, including failure of local delivery systems on university or corporate properties, failure of members to give timely notice of changes of address to the Providence office, failures of postal services, and other human errors.

To help alleviate this problem, the following replacement procedure has been devised: A member who has not received a ballot by October 10, 1980, or who has received a ballot but has accidentally spoiled it, may write after that date to the Secretary, Box 6248, Providence, RI 02940, asking for a second ballot. The request should include the individual's member code and the address to which the replacement ballot should be sent. Immediately upon receipt of the request in the Providence office, a second ballot, which will be indistinguishable from the original, will be sent by first class mail. It must be returned in an inner envelope, which will be supplied, on the outside of which is the following statement to be signed by the member:

The ballot in this envelope is the only ballot that I am submitting in this election. I understand that if this statement is not correct then no ballot of mine will be counted.

Although a second ballot will be supplied on request and will be sent by first class mail, the deadline for receipt of ballots will not be extended to accommodate these special cases.
### Suggestions for 1981 Nominations

#### Council and Board of Trustees

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<thead>
<tr>
<th>Position</th>
<th>Nomination Details</th>
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<tbody>
<tr>
<td>Vice Presidents (2)</td>
<td>Member of the <em>Mathematics of Computation</em> Editorial Committee (1)</td>
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<tr>
<td>Associate Secretaries (2)</td>
<td>Members of the <em>Proceedings</em> Editorial Committee (2)</td>
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<td>Member of the <em>Bulletin</em> Editorial Committee (1)</td>
<td>Members of the <em>Transactions</em> and <em>Memoirs</em> Editorial Committee (2)</td>
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<td>Member of the <em>Colloquium</em> Editorial Committee (1)</td>
<td>Members of the Committee to Monitor Problems in Communication (2)</td>
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<td>Member of the <em>Mathematical Reviews</em> Editorial Committee (1)</td>
<td>Members-at-large of the Council (5)</td>
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<td>Member of the <em>Mathematical Surveys</em> Editorial Committee (1)</td>
<td>Member of the Board of Trustees (1)</td>
</tr>
</tbody>
</table>

The completed form should be addressed to

American Mathematical Society  
Attn: The Nominating Committee  
P.O. Box 6248  
Providence, RI 02940  

to arrive no later than November 10, 1980.

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QUERIES

Edited by Hans Samelson

QUESTIONS WELCOMED from AMS members regarding mathematical matters such as details of, or references to, vaguely remembered theorems, sources of exposition of folk theorems, or the state of current knowledge concerning published or unpublished conjectures.

REPLIES from readers will be edited, when appropriate, into a composite answer and published in a subsequent column. All answers received will ultimately be forwarded to the questioner.

QUERIES AND RESPONSES should be typewritten if at all possible and sent to Professor Hans Samelson, American Mathematical Society, P.O. Box 6248, Providence, Rhode Island 02940.

QUERIES

220. Gerson Francisco (Instituto de Física Teórica-S. P., R. Pamplona 145, 01405 São Paulo, S. P., Brazil). We know from the calculus of exterior differential forms that

\[ d(\omega \wedge \eta) = d\omega \wedge \eta + (-1)^{\deg \omega} \omega \wedge d\eta. \]

Is there a similar formula for \( \delta(\omega \wedge \eta) \)? Here \( \delta \) is the codifferential operator. Assume that the underlying space is a compact manifold and that every thing is \( C^\infty \).

221. E. Lee May, Jr. (Department of Mathematical Sciences, Salisbury State College, Salisbury, MD 21801). Is anything known about the spectral properties of real-linear (i.e., additive and real-homogeneous) but not complex-homogeneous) transformations on complex linear spaces? I would appreciate any reference to a theory or application of such objects.

222. Christopher C. White (Department of Mathematics, Castleton State College, Castleton, VT 05735). Let \( X \) be a compact Hausdorff abelian group with a totally ordered dual. Let \( G \) be the group of invertible elements in \( C(X) \). Does each component of \( G \) contain a character acting on \( X \)?

223. Kenneth S. Williams (Department of Mathematics and Statistics, Carleton University, Ottawa, Canada K1S 5B6). I would be grateful to learn of tables giving the class numbers of quartic fields of type \( Q((2p + 2\sqrt{p})^2) \), where \( p = a^2 + b^2 \equiv 1 \) (mod 4) is prime, \( a \) odd, \( b \) even.

224. S. Zaidman (via D. Piacentino 13, Padova, Italy). I would appreciate receiving any information concerning book location of the following compactness criterion of R. S. Phillips (Trans. Amer. Math. Soc. 48 (1940), 516-541). “A bounded set \( A \) in a Banach space \( X \) is relatively compact iff the linear mapping \( T \) from \( X^* \) into the space of complex-valued bounded functions on \( A \) defined by \( (Tx^*)(x) = x^*(x), \forall x \in A \) is itself compact.”

RESPONSE

The reply below has been received to a query published in a recent issue of the Notices. The editor would like to thank all who have replied.

215. (vol. 27, p. 278, April 1980, R. Gurevich). Is the description of the Boolean algebra \( B \) of closed sets in a space \( Y \) by \( \{X \in B \iff X = A_1 - A_2 \cup A_3 - A_4 \cup \ldots \cup A_{2k-1} - A_{2k} \} \) with \( A_n = \emptyset \) and \( 2k \geq n - 1 \), where \( X_0 = X, X_{n+1} = \overline{X_n} - X_n \), and \( A_{n+1} = \overline{X_n} \) in the literature? Answer: The result, up to notation, is contained in A. H. Stone, Unions of locally compact spaces, Proc. Univ. of Houston Point Set Top. Conf. 1971, Univ. of Houston, Houston, TX, 1971, 56–75. (Contributed by A. H. Stone).

PROBLEM LISTS

ANALYSIS ON SYMMETRIC COMPLEX DOMAINS

The following problem list was prepared at the special session on Analysis on Symmetric Complex Domains at the AMS Meeting on October 20–21, 1979, in Washington, D.C.

1. Michèle Vergne, Massachusetts Institute of Technology. Let \( G = Sp(n, \mathbb{R}) \), acting on the Siegel upper half-plane \( D = \{Z = X + iY, X, Y; n \times n \text{ real symmetric matrices}\} \) by \( g \cdot Z = (AZ + B) \times (CZ + D)^{-1} \), with \( g = (A, B, C, D) \). Let \( S = \{X; n \times n \text{ real symmetric matrices}\} \) be the Shilov boundary of \( D \). We consider the action of \( G \) on functions on \( S \) given by: \( (g^{-1} \cdot f)(X) = f((AX + B)(CX + D)^{-1}) \), or more generally

\[ (T_\lambda(g^{-1} \cdot f))(X) = (\det(CX + D))^{-\lambda} f((AX + B)(CX + D)^{-1}). \]

What is the decomposition of these representations \( T_\lambda \)? For \( \lambda = (n + 1)/2 \), \( T_\lambda(g) \) acts unitarily on \( L^2(S) \) and the decomposition of \( T_\lambda \) is given in Non-commutative harmonic analysis, Lecture Notes in Math., No. 728, Springer-Verlag, pp. 136–175. In this case, the following kernels: \( S^0_q(Z, X) = \det(Z - X)^{-q} \det(\overline{Z} - X)^{-q} \) for \( p + q = \lambda, p \geq 0, q \geq 0 \), send functions \( f(X) \) on \( S \) to functions on \( D \) by \( f S^0_q(Z, X) f(X) dX \). If \( q = 0 \), we naturally obtain as image the holomorphic functions on \( D \); if \( p = 0 \), the antiholomorphic. Is it possible to describe the image for an arbitrary value of \( (p, q) \)?

2. Ichiro Satake, University of California, Berkeley. Let \( U = \text{Sym}_n(\mathbb{R}) \) be the space of all \( r \times r \text{ real symmetric matrices} \). The orthogonal group \( K = SO_0(n, \mathbb{R}) \) acts on \( U \) by \( k(u) = kuk^{-1} \) \( (k \in K, u \in U) \), preserving the inner product \( \langle u, v \rangle = \text{tr}(uv) \) \( (u, v \in U) \). For \( t = (t_1, \ldots, t_r) \in \mathbb{R}^r, v \in U, \) set...
\[ G^{(v)}(t; u) = \int_K \langle \text{diag}(t_1, \ldots, t_r), k(u) \rangle^v \, dk, \]
\[ G(t; u) = \sum_{v=0}^{\infty} (1/uv) G^{(v)}(t; u). \]

**Problem.** Find an expression of \( G(t; u) \) as power series in symmetric polynomials of \( t_1, \ldots, t_r \). For \( r = 2 \), one gets
\[ G(t_1, t_2; u) = \exp(\frac{1}{2}(t_1 + t_2)) \text{tr}(u) \times \int_0(1/2)(t_1 - t_2) \text{tr}(u)^2 - 4 \text{det}(u)^2, \]
where \( \int_0 \) is a Bessel function. In general, is \( G(t; u) \) factored in in power series? This seems to be related with a problem of finding a set of generators \( \varphi_1, \ldots, \varphi_r \), for the ring of \( K \)-invariant polynomial functions on \( U \) such that the monomials in \( \varphi_i \)'s are mutually orthogonal with respect to the metric defined by the above \( \langle \rangle \). Similar problems can be formulated for any formally real Jordan algebra \((U, e)\) and its automorphism group \( K \).

3. **Peter Greiner**, University of Toronto. Let \( H(a) \) denote the Heisenberg ball of radius \( a \) in \( \mathbb{R}^3 \), i.e.
\[ \rho = (|x|^2 + t^2)^{3/2} < a, \quad z = x + iy. \]
This is often referred to as Korányi’s ball of radius \( a \). Set \( \Phi_0(z, t) = (1/2\pi) \rho^{-3/2} \).

**Question.** What is the largest \( \rho \), call it \( \rho_{\text{max}} \), so that for each fixed \((w, s)\), \( \rho(w, s) = 1 \), the power series expansion of \( \Phi_0(z - w, t - s - 2 \text{Im}(zw)) \) about \((z, t) = (0, 0)\) converges in \( H(\rho) \)? There is reason to believe that \( \rho_{\text{max}} \) is the largest \( \rho \) with the property that every function harmonic in \( H(1) \) with respect to \( \Phi_0 \) is \( H(\rho) \). For classical harmonic functions in the Euclidean unit ball \( \rho_{\text{max}} = 1 \) is well known, where \( r^2 = x_1^2 + x_2^2 + x_3^2 \).

4. **Adam Korányi**, Washington University, St. Louis. For \( x = (x_1, x_2) \in \mathbb{R}^2 \) and \( \delta > 0 \) let
\[ P_\delta(x) = \delta^2(|\delta^2 + x_1^2|) \delta^2 + x_2^2 + 1 \]
and let \( L = \text{SO}(2) \) acting on \( \mathbb{R}^2 \) in the natural way. For any function \( f \in L^1(\mathbb{R}^2 \times L) \) (with respect to Haar measure) define \( f^* \) on \( \mathbb{R}^2 \) by
\[ f^*(x) = \sup_{t > 0} \int \int_\mathbb{R}^2 f(y, t) P_\delta(t \cdot y) \, dy \, dt. \]

**Question.** Is the map \( f \mapsto f^* \) weak type \((1, 1)\) (i.e., \( \|f^*\|_1 \leq C \|f\|_1 \), \( C > 0 \)? A positive answer would imply that the Poisson integrals of \( L^1 \)-functions on the symmetric space \( SL(3, \mathbb{R})/SO(3) \) have boundary values on almost all boundary components in a Satake-Furstenberg compactification. The problem stated is a special case of a problem meaningful for all symmetric spaces. In general the place of \( R^2 \) is taken by a nilpotent Lie group, the place of \( L \) by a compact automorphism group of \( N \) and the place of \( P_\delta(x) \) by the “Poisson kernel.” Details about the general case can be found in *Analyse harmonique sur les groupes de Lie* II, Lecture Notes in Math., No. 739, Springer-Verlag, pp. 341–366.

**INTEGRAL EQUATIONS**

The problem list below was provided by A. G. Ramm for the special session on Integral Equations held at the Society’s meeting in Bloomington, Indiana, on April 11-12, 1980.

1. **Prove (or disprove) that the equation**
\[ K\phi = \int_1^\infty \exp(i(x - y)^2) \phi(y) \, dy = -\lambda \phi(x), \quad -1 < x \leq 1 \]
**has eigenvalues.** Do the eigenfunctions of \( K \) form a basis of \( L^2([-1, 1]) \)?

2. **Find an analytical solution of the equation**
\[ R\phi = \int_1^\infty \omega(x, y) \phi(y) \, dy = f(x), \quad -1 < x \leq 1 \]
**in the case, when \( Q(\lambda) \) can be negative.** Class \( R \) consists of the kernels
\[ R(x, y) = \int_\Lambda P(\lambda) Q^{-1}(\lambda) \phi(x, y, \lambda) \, d\rho(\lambda), \]
where \( P(\lambda), Q(\lambda) > 0 \) are polynomials, \( \phi, d\rho, \lambda \) are spectral kernel, spectral measure and spectrum of a selfadjoint elliptic operator \( L, \Omega \in \mathbb{R}^2 \) is a bounded domain with a smooth boundary; theory of equations (1) was developed in A. G. Ramm, *Theory and applications*, Springer-Verlag, July-August, 1980.

4. **Let** \( G(x, y, k) \) be the resolvent kernel of the Laplace operator of the Dirichlet (or Neumann) boundary value problem in the exterior domain \( \Omega = \mathbb{R}^3 \), where \( D \in \mathbb{R}^3 \) is a bounded domain with a smooth boundary, \( \Omega \subset \mathbb{R}^3 \) is a bounded domain with a smooth boundary, \( k \), \( j = 1, 2, 3, \ldots, 6 \) be the complex poles of \( G \). Does the set \( \{k_j\} \) determine uniquely the domain \( \Omega \)?

5. **Let**
\[ \langle f, k \rangle = \int_\mathbb{R}^3 \langle k|\text{exp}(ik|x-y|)/4\pi|k-x-y|\rangle q(y) f(y) \, dy, \quad k > 0, \]
**find a constant \( M = M(q) \) such that**
\[ \|f - \langle f, k \rangle\|_{C(\mathbb{R}^3)} < M(q). \]
This is useful for estimates of cross sections in nonrelativistic potential scattering.

6. **Let** \( \{\lambda_n\} \) be a sequence, \( \lambda_n \sim cn^{2/3}, \quad c = (|D|/6\pi^2)^{-2/3} \) in \( \mathbb{R}^3 \). Find a domain \( D \) such that:
- \( \mu_n(D) - \lambda_n > 0 \), for some \( N > 0, \quad e > 0, \quad |\mu_n(D) - \lambda_n| < e \) if \( n \leq N, \) where \( \mu_n(D) \) are the eigenvalues of the Laplace operator of the Dirichlet problem in \( D \).
7. Find conditions on $B \geq 0$ and $C$ such that 
\[ \lambda_n(A - B - C)/\lambda_n(A - B) \rightarrow 1 \] as $n \rightarrow \infty$, where 
\[ \lambda_n(A - B), \lambda_n(A - B - C) \] are the negative eigenvalues of the selfadjoint operator $A - B$ and $A - B - C$, negative spectrum of $A - B$ and $A - B - C$ is discrete and infinite. Here $A \geq 0$ is a linear operator $(A = -\Delta, B = V(x)$ and $C = V_1(x)$ in some physical problems). (For operators with purely discrete spectrum see A. G. Ramm, Perturbations preserving asymptotic of spectrum, J. Math. Anal. Appl., May 1980).


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**LETTERS TO THE EDITOR**

**Textbooks**

In response to Professor Raimi’s inquiry in the February issue of the Notices, I know of no elementary mathematics textbook that turned out smaller or cheaper than the First Edition.

However, I would venture to suggest that the Second Edition of Ivan Niven’s Calculus: An Introductory Approach, Van Nostrand (1966), was even better than the excellent First Edition which came out in 1961. I deeply regret that this book is no longer in print.

Peter Flusser
Fort Hays State University

**Time and Effort Reporting**

On 6 March 1979, the Office of Management and Budget (OMB) issued a revision of circular A-21. It is the government’s theory that it reimburses universities for costs incurred for research only if it agrees that the costs are allowable. Circular A-21 describes criteria for allowability of such costs at educational institutions. The new version requires effort reports, accounting for the time, or “workload,” or “effort” of faculty members, and requires a breakdown of these into different categories, such as sponsored research, unsponsored research, teaching, administration, and so forth. The percentages for each must add up exactly to 100. These new regulations are to go into effect on 1 October 1980.

This situation duplicates one that arose in March 1965, but in some respects is worse because the new effort reports must include even more categories.

Letters submitted for publication in the Notices are reviewed by the editorial committee whose task is to determine which ones are suitable for publication. The publication schedule requires from two to four months between receipt of the letter in Providence and the publication of the earliest issue of the Notices in which it could appear. The committee adopted a policy that the Notices does not ordinarily publish complaints about reviews of books or articles, although, following an instruction from the Council, rebuttals and correspondence concerning reviews in the Bulletin will be considered for publication. Letters submitted for consideration by the editorial committee should be mailed to the Editor of the Notices, American Mathematical Society, P.O. Box 6248, Providence, Rhode Island 02940.

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*This letter is reprinted (with a few changes made by the author) from Science, 14 March 1980, with permission. Copyright © 1980 by the American Association for the Advancement of Science.*
In 1966, the graduate deans passed the following resolution [1]:

Be it resolved that the Association of Graduate Schools instruct its President to call upon the Association of American Universities to join in addressing the President of the United States our respectful requests: 1. that the present requirement for reporting of effort by individual members of the professional staff be suspended immediately because it admits no meaningful compliance.

As a result of the protest, BOB sent a task force out into the academic world to talk directly with the professors. It was headed by Cecil Goode, who wrote me on 5 February 1968: “I hope your confidence in us will prove well founded.” The task force ultimately understood our complaints and made recommendations in accord with our point of view [2].

Time and effort reports now required of faculty members are meaningless and a waste of time. They have engendered an emotional reaction in the academic community that will endanger university-Federal relations if relief is not provided. They foster a cynical attitude toward the requirements of government and take valuable effort away from more important activities, not the least of which is the research involved. We need to go to a system that does not require documentary support of faculty time devoted to government-sponsored research. No real evidence of faculty effort is provided anyway under the present system, and there is no way other than the research results themselves to prove how much effort was in fact expended . . . . There is practically no satisfaction with time or effort reporting as presently required, either in the academic community or among the government agencies principally involved in supporting research at universities. Most agencies consider the present requirement unrealistic, unnecessary red tape, and as needlessly complicating government relations with universities. The academic community is virtually unanimous in the opinion that effort reporting is:

—impossible to do in a meaningful way;
—burdensome, taking valuable professional time away from the major tasks at hand;
—useless, in that it is inaccurate and bears little relationship to truth; and
—a disincentive to quality research and engenders a cynical attitude toward Government.

Some of the task force’s conclusions are also quoted in the Report of the Commission on Government Paperwork [3], chaired by Representative Frank Horton (R-N.Y.) and Senator Thomas J. McIntyre (D-N.H.).

The Goode task force and its conclusions provided a splendid example of cooperation between the government and the professors. As a result, effort reports, as they had been set forth in 1965, were eliminated on 1 June 1968.

Both in 1965 and in 1979, revision of circular A-21 to include effort reports resulted from pressure by the universities to recover more money from the government for the direct and indirect costs of research. It followed long negotiations (about two years) between government officials (from BOB in 1965 and OMB in 1979) and business officers of universities. Both times it appears that the business officers were unable to achieve appropriate results or properly represent the professorial position, for whatever reason. I have received contradictory accounts of the negotiations, both in 1965 and in the more recent period. One states that the business officers apparently did not realize the implications of the effort reports for academic personnel (or even worse, sold out the professors); another states that effort reports were imposed unilaterally by the government, and (in 1967) that I was naive if I thought that the business officers, the presidents, or the mathematicians could have prevented the inclusion of some kind of time and effort reporting in circular A-21. Although I grant the best motivation on the part of the business officers and OMB, I was and am again concerned with the results of the negotiations.

The position that the government is entitled to accounting for its support is entirely legitimate; neither I nor my colleagues who object to effort reports have ever been against proper accounting. The objections are against meaningless accounting, or accounting improper in the academic setting. For example, several different government agencies may support a research project together. Accountants may think it reasonable to know precisely which parts have been funded by which agency. However, researchers cannot compartmentalize their work in that fashion, and they are sometimes led to transfer charges between closely related grants. Accountants may then see “abuse” when none exists according to the soundest research practices. On the other hand, over the last few years, there have been a few documented cases of abuse or errors, as when a university has charged erroneously a faculty or staff member’s salary to a grant when the individual was not working on that project. I am informed that the total amount of money involved in such cases is extremely small compared to the total amount invested by the government in the universities. But if there is some need to reimburse, why impose meaningless requirements on others? In addition, the audit of new meaningless reports will open the door to further misunderstandings, a vicious circle which should not be allowed to develop.

As in 1968, the government should acknowledge that it is supporting intellectual activities which cannot be measured or accounted for in the same way as, say, the production of material items. In his letter to Science in 1966, Mackey observed that the act of signing effort or time reports causes a professor to ratify a change of his status from that of “independent thinker, partially subsidized so as to have the leisure to think, to that of a professional, employed to do a job.” He wrote further:

One can sympathize with the desires of men charged with the supervision of vast sums of money to see that the money is well spent. However, I believe that vigorous protests are in order when their well meant efforts are insensitive to important differences between an academic appointment and most kinds of employment and when this insensitivity puts men into impossible positions and threatens delicate but valuable institutions.

On 14 December 1979, Yale University’s Deputy Provost Charles Bockelman wrote me:

When we were apprised of the pressure for effort reporting, Yale tried in a variety of forms to express its vigorous opposition to it. It does seem to me that Yale has done all it can through institutional channels. The voices of individual professors may be more effective.
Furthermore, on 19 February 1980, NSF Director Richard C. Atkinson wrote me:
I have followed your correspondence on “effort reporting” with great interest. The government bureaucracy is educable, if one can get their attention. Your approach and tenacity may be what is required to have an effect on these issues.

I hope that many professors will contact OMB Director James McIntyre (Executive Office Building, Washington, D.C. 20503) or Presidential Science Adviser Frank Press (same address) to make themselves properly understood. Such direct appeals are not “naive.” I have no reason to doubt that a result similar to that achieved with the Goode task force will be obtained, except that instead of taking two years as it did in 1966–1968, it will take only a brief period because of the past experience, precedent, and mutual understanding.

Serge Lang
Yale University

References
2. “Time or effort reporting by colleges and universities in support of research grants and contracts: A report by a task force comprised of representatives from the Bureau of the Budget, the General Accounting Office, the Department of Defense, the National Science Foundation, and the Department of Health, Education, and Welfare” (available from the Office of Management and Budget, Washington, D.C., 1968).

Note: Related material may be found in the April 1980 Notices, page 280 (letter by Walter Feit), the June 1980 Notices, page 381 (resolution of AMS Council), and in this issue, page 448 (resolution of the National Academy of Sciences).

**PROCEEDINGS OF THE INTERNATIONAL CONGRESS OF MATHEMATICIANS, HELSINKI 1978**

Edited by Olli Lehto

The Proceedings of the International Congress of Mathematicians held in Helsinki, August 15–23, 1978, are in two volumes. Volume 1 contains an account of the Congress, the list of members, presentations of the works of the Fields medalists, the plenary one-hour addresses, and the invited addresses in sections 1–5. Volume 2 contains the invited addresses in sections 6–19. A complete index is included in both volumes.

On the decision of the Fields Medals Committee, the works of the Fields medalists were presented as follows:

N. M. Katz: *The work of Pierre Deligne*
L. Carleson: *The work of Charles Fefferman*
J. Tits: *The work of Gregori Aleksandrovitch Margulis*
I. M. James: *The work of Daniel Quillen*

The invited one-hour plenary addresses included follow:

L. V. Ahlfors, *Quasiconformal mappings, Teichmüller spaces, and Kleinian groups*
A. P. Calderón, *Commutators, singular integrals on Lipschitz curves and applications*
A. Connes, *von Neumann algebras*
R. D. Edwards, *The topology of manifolds and cell-like maps*
D. Gorenstein, *The classification of finite simple groups*
M. Kashiwara, *Micro-local analysis*
N. N. Krasovskii, *Control under incomplete information and differential games*
R. P. Langlands, *L-functions and automorphic representations*
Ju. I. Manin, *Modular forms and number theory*
S. P. Novikov, *Linear operators and integrable Hamiltonian systems*
R. Penrose, *The complex geometry of the natural world*
W. Schmid, *Representations of semisimple Lie groups*

A. N. Shiryaev, *Absolute continuity and singularity of probability measures in functional spaces*
A. Weil, *History of mathematics: why and how*
S.-T. Yau, *The role of partial differential equations in differential geometry.*

In addition there were 120 invited forty-five-minute addresses divided into nineteen sections. The sections follow:

1. Mathematical logic and foundations of mathematics
2. Algebra
3. Number theory
4. Geometry
5. Topology
6. Algebraic geometry
7. Lie groups, algebraic groups, automorphic functions
8. Real and functional analysis
9. Complex analysis
10. Operator algebras and group representations
11. Probability and mathematical statistics
12. Partial differential equations
13. Ordinary differential equations and dynamical systems
14. Control theory and optimization problems
15. Mathematical physics and mechanics
16. Numerical analysis
17. Discrete mathematics and mathematical aspects of computer science
18. Mathematics in the social and biological sciences
19. History and Education.

**Prepayment is required for all American Mathematical Society publications.**

Send for the book(s) above to: AMS, P.O. Box 1571, Annex Station, Providence, RI 02901.
NEWS AND ANNOUNCEMENTS

HARVEY PRIZE IN
SCIENCE AND TECHNOLOGY

Michael O. Rabin, Albert Einstein Professor of
Mathematics at the Hebrew University, has been
awarded the Harvey Prize in Science and Technology
for 1980. Amos Horev, President of the Technion-
Israel Institute of Technology, in announcing the
award reported that it was "in recognition of
[Rabin's] outstanding contributions to Computer
Theory. His groundbreaking work has served as a
source of inspiration to computer scientists, thus
setting the course of modern Computer Science."

According to a Technion press release, "The
Harvey Prizes bear the name of the late Leo M.
Harvey of Los Angeles, who was a prominent leader
of the American Technion Society. Mr. Harvey, who
died in January 1973 at the age of 87, was Founder
and Chairman of Harvey Aluminum Company. The
Harvey Prize Fund was established by a gift of
$1,000,000 from the Lena P. Harvey Foundation in
Los Angeles to the American Technion Society in
1971."

"The fund was established in perpetuity to make
annual awards in one or more of four fields: Science
and Technology; Human Health; Literature of Pro-
found Insight into the Life of the Peoples of the
Middle East; and the Advancement of Peace in the
Middle East. Each prize bears a cash award of
$35,000."

Among earlier recipients of Harvey Awards in
Science and Technology are Claude E. Shannon
(1972), Edward Teller (1975), and Freeman Dyson

ROLLO DAVIDSON PRIZES

Rollo Davidson Prizes for 1980 have been
awarded to David John Aldous of the Department of
Statistics, University of California, Berkeley, and
Erik Jørgensen of the Institute for Electrical Systems,
University of Aalborg, Denmark. Aldous was cited
for his contributions to almost sure properties of
subsequences, to a novel concept of weak convergence,
and to representations of partially exchangeable
arrays. Jørgensen was cited for his contributions to
"the central limit problem" on Riemannian manifolds
and to the construction of diffusions of certain types
on manifolds.

The Davidson Prizes are administered by the
Rollo Davidson Trust.

SLOAN FOUNDATION

Cathleen S. Morawetz, Professor of Mathematics
at the Courant Institute of Mathematical Sciences,
New York University, has been elected to the Board
of Trustees of the Alfred P. Sloan Foundation of
New York City. Professor Morawetz is a member of
the Board of Trustees of the American Mathematical
Society, and has served as a Trustee of
Princeton University.

CHERYL TROPF AWARDED
AMS-MAA-SIAM CONGRESSIONAL
SCIENCE FELLOWSHIP

The third Congressional Science Fellowship to be
awarded to Cheryl Griffiths Tropf, a senior
staff mathematician at the Applied Physics Labora-
tory of The Johns Hopkins University. The panel of
the AMS-MAA-SIAM Joint Projects Committee for
Mathematics which made the award consisted of
Edwin E. Floyd of the University of Virginia, Wendell
H. Fleming of Brown University, John K. Goldhaber
of the University of Maryland, College Park, and
Seymour V. Parter (Chairman) of the University of
Wisconsin, Madison. Dr. Tropf, who is 33 years old,
is a graduate of the College of William and Mary with
a bachelor of science degree in physics. She received
master's and doctor's degrees in applied mathematics
from the University of Virginia, the latter degree in
1973. She will serve along with some twenty-seven
other Congressional Science and Engineering Fellows
sponsored by professional societies or groups of so-
cieties in an overall program managed by the Ameri-
can Association for the Advancement of Science.
Four of the 1980-1981 Fellows are unusual in that
they are sponsored by professional societies in the
humanities rather than in the sciences or engineering,
two of them by the American Historical Society and
the other two by the American Philosophical Asso-
ciation.

The first AMS-MAA-SIAM Congressional Fellow-
ship was awarded for the year 1978-1979, to Dr.
Edmund Gregory Lee, who came from the mathe-
matics faculty of Fordham University and spent his
Fellowship year working on the staff of the Subcom-
mittee on Science, Research, and Technology, of
the House Committee on Science, Research, and
Technology of the House Committee on Science and
Technology. (See his account of his experiences in the March-
April 1979 CBMS Newsletter, pp. 17-19; reprinted
in the August 1979 Notices, pp. 301-302.) Follow-
ing his Fellowship year, Dr. Lee accepted a position
with Floating Point Systems, a data processor manu-
facturing company in Portland, Oregon. The second
and present holder of the AMS-MAA-SIAM Fellow-
ship is Dr. Robert T. Smythe of the department of
mathematics at the University of Oregon. Dr. Smythe
is working during his fellowship year in the office of
Representative George E. Brown, Jr. (D-Calif., 26),
Chairman of the Subcommittee on Science, Research,
and Technology of the House Committee on Science and
Technology. (Dr. Smythe's impressions after
three months of his Fellowship year appear in the
January-February 1980 CBMS Newsletter, pages 4-6.)

Each of the Congressional Science and Engineer-
ing Fellows spends his or her Fellowship year, which
begins in September, working on the staff of an indi-
vidual congressman or a congressional committee or
in the congressional Office of Technology Assessment. The objective of the program is to enhance science-government interaction, the effective use of science in government, and the training of persons with scientific background for careers involving such use. Based on information on available congressional staff positions gathered during the summer by the American Association for the Advancement of Science, each Fellow's assignment is worked out by the Fellow and the congressional office concerned following an intensive two-week orientation and interview procedure organized by the AAAS during which the Fellows encounter many facets of Congress, the Executive Branch, and people and organizations on the Washington scene. The AAAS provides advice and assistance during this process and remains in frequent and regular contact with all the Fellows throughout the Fellowship year.

—CBMS News Release

ROLF HERMAN NEVANLINNA

Rolf Nevanlinna died May 28, 1980, at the age of 84. He was educated at Helsinki University and served his alma mater between 1922 and 1945 as dozent, professor, dean of the Faculty of Sciences, and Rector. He was elected to the Finnish Academy of Science and Letters in 1948. He served as president of the International Mathematical Union from 1959 to 1962, as professor at the University of Zurich (1947-1948) and as Chancellor of the University of Turku from 1965 to 1970.

PAUL ALTHAUS SMITH

Professor Emeritus P. A. Smith of Columbia University died June 13, 1980, at the age of eighty. He was a member of the Society for 54 years. Professor Smith served as a member of the Council for ten years: eight years as a member of the Bulletin editorial committee (1938 to 1945) and two years as vice-president (1947, 1948). He was treasurer of the Society from November 1936 to December 1937 and a member of the Board of Trustees from 1948 to 1953. He was elected to the National Academy of Sciences in 1947.

NATIONAL ACADEMY OF SCIENCES
RESOLUTION ON EFFORT REPORTS

The following resolution was passed by the National Academy of Sciences at its Business Meeting on April 22, 1980.

"While supporting the principle of accountability for usage of public funds, NAS views with concern the proposed implementation of OMB revised circular A-21, effective July 1, 1980. Application of these new regulations to institutions of higher learning would further constrain the already limited flexibility in research thrust, increase the administrative burden, reduce morale among teaching and research personnel, and provide a cumbersome, meaningless documentation in terms of percent-of-effort for a continuum of scholarly activities. Moreover, because these regulations would monitor non-federally supported academic functions as well, inappropriate controls might be exercised. We therefore urge reconsideration of regulations embodied in A-21 and we recommend that the Council of the Academy examine this situation so as to propose appropriate ways of achieving accountability."

[This question has been discussed in letters by Walter Feit, April 1980 Notices, pp. 280-281, and Serge Lang, p. 444 of this issue.]

1982 AMS SUMMER INSTITUTE

Suggestions for topics of the 1982 AMS summer research institute should be received by the Committee on Summer Institutes prior to December 15 for consideration at the annual meeting in San Francisco. The institute is intended to provide an understandable presentation of the state of the art in an active field of research in pure mathematics (there are other provisions for presentations in applied mathematics). Optimally, the suggestions should include the proposed members of the Organizing Committee (or at least its chairperson) and a two- or three-page detailed outline of the subjects to be covered, including suggested principal speakers. The organizer of the summer institute ultimately selected should note that he or she will receive the full support and assistance of the professional meeting staff in the Society's Providence office.

Recent topics have been Harmonic Analysis in Euclidean Spaces and Related Topics (1978); Finite Group Theory (1979); and Operator Algebras and Applications (1980).

Anyone wishing to suggest topics should write to the Meeting Arrangements Department at the American Mathematical Society, P. O. Box 6248, Providence, Rhode Island 02940, and request the form to be submitted to Professor Robert Osserman, Chairman of the AMS Committee on Summer Institutes. Be aware that dates for a summer institute must not overlap those of the Society's summer meeting and, in fact, there should be a period of at least one week between them.

NSF RESEARCH PROPOSALS
MATHEMATICAL SCIENCES SECTION

The purpose of this announcement is to focus attention on certain important items involved in the preparation of NSF research proposals. For details, prospective applicants are referred to the brochure Grants for Scientific Research (NSF 78-41 or NSF 78-41A) available from institutional research administration officials or directly from NSF (Forms and Publications, NSF, Washington, D.C. 20550).

Proposals requesting support to begin prior to November 1, 1981, should be at NSF by October 25, 1980.

The usual support period requested should be two years or more. Submit separate itemized budgets for each year and a summary budget.

Proposal cover sheets should display prominently in the upper left-hand corner, but separately from the title, the first two digits of the 1980 Mathematics Subject Classification used in Mathematical Reviews.
Individual topics proposed for research should be identified with the appropriate full Subject Classification codes. The probable program assignment (e.g., Statistics, Geometry, Topology, etc.) may also be included.

Particular attention must be paid to the required 200–300 word summary of work being proposed, following the format of the NSF Project Summary Form (see NSF 78–41, p. 21, or NSF 78–41A, p. 46).

The abstract must satisfy the following conditions:

(a) it must be self-contained;
(b) the pertinent subfield of science (e.g., algebraic number theory, global analysis, decision theory, etc.) should be stated explicitly in the first sentence;
(c) symbols used should be on standard typewriters;
(d) avoid first person pronouns and such phrases as “proposer” and “it is proposed”; in their place, use “principal investigator” and Professor X plans to,” etc.; and
(e) the abstract should be expressed, insofar as possible, in language that can be understood by an educated lay reader.

Recent Ph.D. recipients should be aware of the difficulties faced by reviewers in commenting on the applicant's ability to complete the proposed research. Thus, whether applying alone or together with others, pay particular attention to the elements of good proposal writing. These include a clear description of proposed research and of methods to be used, as well as evidence of past research accomplishments, including summaries of theses and preprints of completed research not yet available in readily accessible journals.

In addition, each proposal should contain:

1. a full description of all other current research support or pending applications for such, for all proposed investigators; in case there is no other support and no other application is pending or contemplated, the proposal must contain an unequivocal and explicit statement to that effect (e.g., “None of the listed investigators has any other research support and no other application is pending or contemplated”);

2. in requests for renewed support, estimates both of total expenditures and commitments under the existing award to the date at which new funding is desired, and of the projected residual balance, if any (see NSF 78–41, or NSF 78–41A, pp. 32–33);

3. justification for any but the most usual items of support; in particular, this should be done in requests for partial support of sabbatical leaves, dedicated computation equipment, etc.;

4. curricula vitae of the proposed investigators, including for each a chronological list of publications; and

5. a bibliography of important publications relevant to the proposed research.

The telephone numbers of the department and the principal investigator(s) should be listed.

The check list below may be useful in the preparation of proposals.

Cover Page
Table of Contents
Project Abstract
For each investigator:
  Description of Proposed Research
  Curriculum Vitae
Publication List (arranged chronologically)
Separate Budget for each year and Summary Budget
Residual Fund Statement (see (2) above)
Other Support Statement (see (1) above)
Appendices

Ten copies of the proposal should be submitted.

William G. Rosen, Head
Mathematical Sciences Section

NSF INVITES PROPOSALS
FOR REGIONAL CONFERENCES FOR 1981

The National Science Foundation is seeking proposals from prospective host institutions in the U.S. for five-day regional conferences, each to feature ten lectures by a distinguished guest lecturer on a subject of current research interest in the mathematical sciences. An applying institution should have at least a minimal research competence in the area of its proposal. The conferences are to be held during the summer of 1981 (not earlier than June) or during the succeeding academic year. The objective of the project is to stimulate and broaden mathematical research activity on a regional basis. The organization of the conferences, evaluation of proposals, and arrangements for publication of expository papers based on the guest speakers' lectures are to be carried out by the Conference Board of the Mathematical Sciences under contract with the Foundation. The conference awards themselves, however, are made by the National Science Foundation.

Approximately ten conferences per year are projected, each to take place at a host institution during a summer week, or possibly within a recess of the succeeding academic year. Topics for conferences may be concerned with any of the subdisciplines of the mathematical sciences. Each conference must plan for a single principal guest lecturer and about twenty-five other invited participants, the latter to be active research mathematicians from the broad geographic region around the host institution. It is expected that the lecturer will give two lectures per day during the five days of the conference, with the remainder of the time available for study, informal discussion, and exchange of ideas. All invited participants in a conference receive allowances for travel and subsistence under the host institution's grant from the Foundation for the conference. In addition, the principal lecturer receives from the Conference Board a fee for delivering his lectures and a second fee for organizing these into a substantial expository paper. The Conference Board arranges for editing and publication of these papers. Proposals by prospective host institutions (twenty copies) should be sent directly to the Mathematical Sciences Section (Attention Dr. William H. Pell) National Science
Foundation, 1800 G Street, N. W., Washington, D. C. 20550, and must be received by 15 November 1980. Proposals will be evaluated by a panel of the Conference Board and awards of conference grants will be made by the National Science Foundation with advice of the panel.

Inquiries regarding details of proposals for these regional conferences should be addressed to the Conference Board of the Mathematical Sciences, 1500 Massachusetts Avenue, N. W., #457-8, Washington, D. C. 20005.

VISITING LECTURER PROGRAM IN STATISTICS 1980-1981

The Visiting Lecturer Program in Statistics is continuing into its eighteenth successive year. This year's program again is available to Canadian schools. The program is sponsored jointly by the principal statistical organizations in North America: the American Statistical Association, the Biometric Society and the Institute of Mathematical Statistics. Leading teachers and research workers in statistics—from universities, industry and government—have agreed to participate as lecturers. Lecture topics include subjects in experimental and theoretical statistics, as well as in such related areas as probability theory, information theory and stochastic models in the physical, biological and social sciences.

The purpose of the program is to provide information to students and college faculty members about the nature and scope of modern statistics, and to provide advice about careers, graduate study, and college curricula in statistics. Inquiries should be addressed to: Barry C. Arnold, chairman, Visiting Lecturer Program in Statistics, Department of Statistics, University of California, Riverside, CA 92521.

Among the participating lecturers are: Dennis J. Aigner, University of Southern California; Joseph R. Assenzo, The Upjohn Company; Barbara A. Bailar, Bureau of the Census; Colin Blyth, Queens University; Duane C. Boes, Colorado State University; K. O Bowman, Union Carbide Corporation; Foster B. Cady, Cornell University; Arthur Cohen, Rutgers University; Bradford R. Crain, Portland State University; Jonathan Cryer, University of Iowa; Ralph B. D'Agostino, Boston University; F. N. David, University of California, Berkeley; H. A. David, Iowa State University; Morris H. DeGroot, Carnegie-Mellon University; John L. Denny, University of Arizona; Robert M. Elashoff, University of California, Los Angeles; William A. Ericson, University of Michigan; Polly Feigl, University of Washington; J. Leroy Folks, Oklahoma State University; D. A. S. Fraser, University of Toronto; Spencer M. Free, Smith, Kline and French Laboratories; A. Ronald Gallant, Duke University; Donald P. Gaver, Naval Postgraduate School; Leon J. Gleiser, Purdue University; Richard A. Groeneveld, Iowa State University; Shelby J. Haberman, University of Chicago; Robert V. Hogg, University of Iowa; Myles Hollander, Florida State University; Susan Dadakis Horn, Johns Hopkins University; J. Stuart Hunter, Princeton University; Dallas E. Johnson, Kansas State University; David Jowett, University of Wisconsin, Green Bay; Joseph B. Kadane, Carnegie-Mellon University; S. K. Katti, University of Missouri, Columbia; Jerome H. Klotz, University of Wisconsin, Madison; L. H. Koopmans, University of New Mexico; Anant M. Kshirsagar, University of Michigan; Gary G. Koch, University of North Carolina; Samuel Kotz, University of Maryland; Solomon Kullback, George Washington University; Richard E. Lund, Montana State University; Nancy R. Mann, University of California, Los Angeles; Lincoln E. Moses, Stanford University; Janet L. Norwood, Bureau of Labor Statistics; Ingram Olkin, Stanford University; G. P. Patil, Pennsylvania State University; Michael D. Perlman, University of Washington; Frank Proschan, Florida State University; Peter Purdue, University of Kentucky; Madan L. Puri, Indiana University; Dale O. Richards, Brigham Young University; Jagdish S. Rustagi, Ohio State University; Richard R. Scott, Eastman Kodak Company; Donald T. Searls, National Assessment of Educational Progress; Neil Sedransk, SUNY, Albany; F. Michael Speed, Louisiana State University; Kenneth J. Tiaht, Montana State University; William F. Taylor, Mayo Clinic; W. A. Thompson, Jr., University of Missouri, Columbia; John Van Ryzin, Columbia University; James A. Walsh, University of Montana; Milton Winger, University of North Dakota; Kirk M. Wolter, Bureau of the Census; Farroll Tim Wright, University of Missouri, Rolla; Marvin Zelen, Harvard University.

SPECIAL MEETINGS

THIS SECTION contains announcements of meetings of interest to some segment of the mathematical public, including ad hoc, local, or regional meetings, and meetings or symposia devoted to specialized topics, as well as announcements of regularly scheduled meetings of national or international mathematical organizations. (Information on meetings of the Society, and on meetings sponsored by the Society, will be found inside the front cover.)

AN ANNOUNCEMENT will be published in the Notices if it contains a call for papers, and specifies the place, date, subject (when applicable), and the speakers; a second full announcement will be published only if there are changes or necessary additional information. Once an announcement has appeared, the event will be briefly noted in each issue until it has been held and a reference will be given in parentheses to the month, year and page of the issue in which the complete information appeared.

IN GENERAL, announcements of meetings held in North America carry only date, title of meeting, place of meeting, names of speakers (or sometimes a general statement on the program), deadline dates for abstracts or contributed papers, and source of further information. Meetings held outside the North American area may carry more detailed information. All communications on special meetings should be sent to the Editor of the Notices, care of the American Mathematical Society in Providence.

DEADLINES are listed on the inside front cover of each issue.


1980. SPECIAL YEAR ON FUNCTIONAL EQUATIONS AND THEIR APPLICATIONS, University of Waterloo, Ontario, Canada. (February 1980, p. 186)

Summer 1980. CONFERENCE ON THE SIMULATION OF LARGE SYSTEMS, University of Bielefeld, Federal Republic of Germany. (January 1980, p. 85)

June 1-December 20. MATHEMATHISCHES FORSCHUNGSINSTITUT OBERWOLFACH (Weekly Conferences), Federal Republic of Germany. (June 1980, p. 366)

AUGUST 1980

4-8. INTERNATIONAL SEMINAR ON FUNCTIONAL ANALYSIS, HOLOMORPHY AND APPROXIMATION THEORY, Universidade Federal do Rio de Janeiro, Brasil. (April 1980, p. 288)

4-8. WORKSHOP ON THE PRESENT TRENDS OF REPRESENTATION THEORY, Universidad Autónoma de Puebla, Puebla, Mexico. (April 1980, p. 286)

4-15. THIRD INTERNATIONAL CONFERENCE ON PROBABILITY IN BANACH SPACES, Tufts University, Medford, Massachusetts. (June 1980, p. 368)

4-15. NATO ADVANCED STUDY INSTITUTE ON GENERALIZED CONVEXITY IN OPTIMIZATION AND ECONOMICS, Vancouver, Canada. (February 1980, p. 190)

4-22. CANADIAN MATHEMATICAL SOCIETY SUMMER SEMINAR IN HARMONIC ANALYSIS, McGill University, Montreal, Canada. (June 1980, p. 368)

4-22. SEMINAR ON COMPLEX MANIFOLDS: APPLICATIONS TO ALGEBRAIC GEOMETRY AND MATHEMATICAL PHYSICS, University of Montreal, Montreal, Canada. (January 1980, p. 87; February 1980, p. 190)

8-16. THIRD INTERNATIONAL CONFERENCE ON REPRESENTATION OF ALGEBRAS, Universidad Autónoma de Puebla, Puebla, Mexico. (April 1980, p. 288)

10-16. FOURTH INTERNATIONAL CONGRESS ON MATHEMATICAL EDUCATION, Berkeley, California. (August 1979, p. 319)

11-15. CONFERENCE ON CONSTRUCTIVE MATHEMATICS, New Mexico State University, Las Cruces, New Mexico. (April 1980, p. 288)

11-15. INTERNATIONAL CONFERENCE ON CATEGORICAL ASPECTS OF TOPOLOGY AND ANALYSIS, Carleton University, Ottawa, Canada. (November 1979, p. 487)


14-28. WORKSHOP ON TOPOLOGY AND LINEAR ORDERINGS, Texas Tech University, Lubbock, Texas. (June 1980, p. 369)

17-23. FIFTEENTH INTERNATIONAL CONGRESS OF THEORETICAL AND APPLIED MECHANICS, Toronto, Canada. (October 1979, p. 413)

18-22. NSF-CBMS REGIONAL CONFERENCE ON HOMOLOGY AND DYNAMICAL SYSTEMS, Emory University, Atlanta, Georgia. (June 1980, p. 369)

18-22. SUMMER MEETING IN LOGIC, University of Patras, Greece. (February 1980, p. 190)

18-22. SEVENTH AUSTRALASIAN HYDRAULICS AND FLUID MECHANICS CONFERENCE, Brisbane, Australia. (November 1979, p. 487).

18-22. COMPSTAT 80: FOURTH SYMPOSIUM ON COMPUTATIONAL STATISTICS, Edinburgh University, Scotland. (October 1979, p. 413; April 1980, p. 289)

18-23. EIGHTEENTH SCANDINAVIAN CONGRESS OF MATHEMATICIANS, Aarhus, Denmark. (February 1980, p. 190)

18-September 20. INTERNATIONAL SYMPOSIUM ON PARTIAL DIFFERENTIAL EQUATIONS AND DIFFERENTIAL GEOMETRY, Beijing, People’s Republic of China. (June 1980, p. 369)


24-30. LOGIC COLLOQUIUM 80 AND EUROPEAN SUMMER MEETING OF THE ASSOCIATION FOR SYMBOLIC LOGIC, Prague, Czechoslovakia. (February 1980, p. 190)


25-29. COLLOQUIUM ON LATTICE THEORY, József Attila University, Szeged, Hungary. (June 1980, p. 369)

25-29. EIGHTH AUSTRALIAN CONFERENCE ON COMBINATORIAL MATHEMATICS, Deakin University, Geelong, Victoria, Australia. (November 1979, p. 487)
25-September 7. EIGHTEENTH INTERNATIONAL SYMPOSIUM ON FUNCTIONAL EQUATIONS, Renison College, University of Waterloo; Guild Inn, Scarborough, Ontario, Canada. (January 1980, p. 87)


27-September 3. INTERNATIONAL CONFERENCE ON YOUNG TABLEAUX AND SCHUR FUNCTIONS IN ALGEBRA AND GEOMETRY, Torun, Poland. (February 1980, p. 190)

28-30. IV BONN WORKSHOP ON COMBINATORIAL OPTIMIZATION, Institut für Ökonomikum und Operations Research, University of Bonn. (June 1980, p. 369)

SEPTEMBER 1980


1-13. INTERNATIONAL CONFERENCE ON OPERATOR ALGEBRAS AND GROUP REPRESENTATIONS, Black Sea Coast, Romania. (February 1980, p. 191)

9-11. THIRD IMA CONFERENCE ON CONTROL THEORY, Sheffield, Great Britain. (June 1980, p. 369)

10-12. DURHAM/LONDON MATHEMATICAL SOCIETY MEETING ON STOCHASTIC INTEGRALS, Durham, Great Britain. Information: David Williams, Department of Pure Mathematics, University College, Swansea, Wales SA2 8PP, Great Britain.


15-October 3. SUMMER SCHOOL OF THE INTERNATIONAL CENTRE FOR PURE AND APPLIED MATHEMATICS: HARMONIC ANALYSIS, Nancy, France. (February 1980, p. 191)

17-19. INTEGRATED PROGRAMS FOR AEROSPACE-VEHICLE DESIGN--NATIONAL SYMPOSIUM, Denver, Colorado. (February 1980, p. 191)

22-October 3. NATO ADVANCED STUDY INSTITUTE ON SINGULARITIES IN BOUNDARY VALUE PROBLEMS, Maratea, Italy. (February 1980, p. 191)

26-27. EIGHTH ANNUAL MATHEMATICS AND STATISTICS CONFERENCE, Miami University, Oxford, Ohio. (February 1980, p. 191)

26-27. ANNUAL PI MU EPSILON STUDENT CONFERENCE (OHIO DELTA CHAPTER), Miami University, Oxford, Ohio. (February 1980, p. 191)


OCTOBER 1980

2-4. MOTIVATIONS, APPLICATIONS, PROBLEMES DANS L'ENSEIGNEMENT DES MATHEMATIQUES A L'UNIVERSITE, Montpellier, France. Information: J.-P. Olivier, Mathematics Department, Université Paul Valéry, B.P. 5043, F-34032 Montpellier Cedex, France.

2-8. CONFERENCE ON APPLICATIONS OF NUMERICAL ANALYSIS AND SPECIAL FUNCTIONS IN STATISTICS, Adult Education Center, University of Maryland. (June 1980, p. 370)

6-17. INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING CONGRESS, Tokyo, Japan and Melbourne, Australia. (November 1979, p. 467)

11-12. EIGHTH MIDWEST PARTIAL DIFFERENTIAL EQUATIONS SEMINAR, Van Vleck Hall, University of Wisconsin, Madison, Wisconsin. Information: Bob Turner, Department of Mathematics, Van Vleck Hall, University of Wisconsin, Madison, Wisconsin 53706, (608) 263-6272.

13-15. SYMPOSIUM ON TRANSITION AND TURBULENCE, Mathematics Research Center, University of Wisconsin, Madison, Wisconsin. (November 1979, p. 487)

13-15. TWENTY-FIRST ANNUAL SYMPOSIUM ON THE APPLICATIONS OF COMPUTER SCIENCE, Sheraton Inn, Syracuse, New York (February 1980, p. 191). **The date and location of this meeting have been changed from those previously listed.**

15-17. RUTISHAUSER SYMPOSIUM ON NUMERICAL ANALYSIS, Zurich, Switzerland. Information: Conference Office, Seminar f. Angewandte Mathematik, ETH-Zentrum, CH-8092 Zurich, Switzerland.

24-25. CONFERENCE ON MEASURE THEORY, Northern Illinois University, DeKalb, Illinois. (April 1980, p. 289)

NOVEMBER 1980


14-15. FOUNDATIONS: LOGIC, LANGUAGE, AND MATHEMATICS, Graduate Center, City University of New York, New York. (June 1980, p. 370)

DECEMBER 1980

1-6. FIRST CONGRESS OF BIOMATHEMATICS, Concepcion, Chile. (April 1980, p. 289)


16-19. FOURTH CONFÉRENCE INTERNATIONALE SUR L'ANALYSE ET L'OPTIMISATION DES SYSTÈMES, Versailles, France. (June 1980, p. 370)

JANUARY 1981

2-8. WINTER RESEARCH INSTITUTE ON GEOMETRIC QUANTIZATION, Banff, Alberta, Canada. (June 1980, p. 370)

5-8. THIRD CARIBBEAN CONFERENCE ON COMBINATORICS AND COMPUTING, University of the West Indies, Barbados. Information: Charles Cadogan, University of the West Indies, P.O. Box 64, Bridgetown, Barbados, West Indies.

12-February 6. TWENTY-FIRST SUMMER RESEARCH INSTITUTE OF THE AUSTRALIAN MATHEMATICAL SOCIETY, University of Tasmania, Hobart, Australia. (June 1980, p. 370)
FEBRUARY 1981

8-12. CONFERENCE ON ALGEBRA AND GEOMETRY, Kuwait University, Kuwait.
Sponsors: Kuwait University and Kuwait Institute for the Advancement of Science.
Program: Two one-hour lectures will be given by R. Ayoub (Pennsylvania State University), K. Benabdulla (University of Montreal), S. Singh (Kuwait University), S. M. Yahya (University of Petroleum and Minerals, Dhahran), A. J. Ledger (University of Liverpool), G. Pickert (Mathematisches Institut, Giessen), U. Simon (Technische Universität, Berlin), A. Sve (Kuwait University), R. Mishra (Kuwait University).

Contributed Papers: Contributed papers are invited as there will be sessions of 15-20 minutes for presentation of such papers.
Deadline for Abstracts: November 1, 1980.
Support: Some support for travel and subsistence may be available.
Information: M. A. Al-Bassam, Department of Mathematics, Kuwait University, Kuwait, State of Kuwait.

MARCH 1981

Program: Approximately fifteen sessions will be organized. There will also be informal poster sessions.

18-20. FOURTEENTH ANNUAL SIMULATION SYMPOSIUM, Tampa, Florida.
Call for Papers: The conference is mainly concerned with digital discrete simulation, but papers describing other techniques, such as continuous or analog, will be considered. An award will be made for the best paper, judged on the basis of subject matter, applicability, presentation, and other selected judgments.
Information: Ron Huhn, Chairman, Speaker's Committee, Fourteenth Annual Simulation Symposium, P.O. Box 1953, Melbourne, Florida 32901.

APRIL 1981

6-8. ENVIRONMETRICS '81, Washington, D.C.
Sponsors: SIAM, the SIAM Institute for Mathematics and Society, and the U.S. Environmental Protection Agency. Co-sponsors are the Air Pollution Control Association, American Meteorological Society, the Environmental Technical Committee of the American Society for Quality Control, and the Committee on Statistics and the Environment of the American Statistical Association.
Topics: Environmental media; health and ecological effects; source monitoring; ambient monitoring; measurement systems; standards; models of pollutant transport and fate; interface problems; prediction and trend analysis; and relevant computer packages.
Call for Papers: A one-page typewritten summary should be mailed to the Program Committee at the address below by October 15, 1980. Priority will be given to papers in those areas where appropriate forums do not already exist or are just emerging.
Information: Environmetrics '81, SIAM Institute for Mathematics and Society, 33 South 17th Street, Philadelphia, Pennsylvania 19103.

8-10. 2e CONFÉRENCE INTERNATIONALE SUR LES SYSTEMES INFORMATIQUES RÉPARTIS, Paris, France.
Information: INRIA, Serv. Rélig., Domaine de Voluceau, B.P. 105, 78150 Le Chesnay, France.

30-May 1. TWELFTH ANNUAL PITTSBURGH CONFERENCE ON MODELING AND SIMULATION, University of Pittsburgh, Pittsburgh, Pennsylvania.
Program: Emphasis of the conference will be on microprocessors and their applications as well as energy, social, economic, and global modeling and simulation and papers on all traditional areas of modeling and simulation.
Call for Papers: Two copies of titles, authors, authors' addresses, abstracts and summaries should be submitted to the address below by January 31, 1981.

MAY 1981

16-23. INTERNATIONAL CONFERENCE ON FUNCTIONAL-DIFFERENTIAL SYSTEMS AND RELATED TOPICS. II, Kozubnik, Poland.
Topics: Differential and integral equations with transformed argument; time-lag systems; control and observation problems, stability and stabilization, optimization; algebraic methods; applications in engineering, economics, etc.
Call for Papers: Abstracts (one or two pages) should be sent to the Program Committee at the address below no later than January 15, 1981. Conference languages are English and Russian.
Information: D. Przeworski-Rólewicz, Mathematical Institute, Polish Academy of Sciences, Sniadecki 8, 00-950 Warszawa, P.O. Box 137, Poland.

JUNE 1981

28-July 5. NINTH INTERNATIONAL CONGRESS ON THE APPLICATION OF MATHEMATICS IN ENGINEERING, Weimar, German Democratic Republic.
Program: The main emphasis of the Congress is on the application of mathematics and computers in structural mechanics and civil engineering. Papers are sought in the following areas: mathematical methods in construction techniques; mathematical models and automated information systems for management in construction production; mathematical models and methods in stochastics and optimizations; numerical and computer methods; computer supported projections and technological preparations.
Information: H. Matzke, President of the IX. IKM, Karl-Marx-Platz 2, 53 Weimar DDR, East Germany.

Sponsors: Canadian Mathematical Society; The University of Western Ontario.
Information: V. P. Snaith and S. O. Kochman, Department of Mathematics, The University of Western Ontario, London, Ontario, N6A 5B9, Canada.

AUGUST 1981

30-September 6. NINTH INTERNATIONAL CONFERENCE ON NONLINEAR OSCILLATIONS, Kiev, USSR.
Purpose: The objective of the conference is to review the recent progress in oscillation theory and its applications and to outline the prospects in its further achievements; then to coordinate and direct research in this field and to extend cooperation between various scientific institutions.
Program: There will be invited talks and short contributed talks. Four sections of the conference will cover: analytic methods of the theory of nonlinear oscillations; qualitative methods of the theory of nonlinear oscillations; application of the theory of nonlinear oscillations to mechanics; application of the theory of nonlinear oscillations to engineering and electronics.
Deadline for Abstracts: December 1, 1980.
Information: Organizing Committee, Institute of Mathematics, Repin Str. 3, 252004, Kiev-4, USSR.
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APPROXIMATION BY POLYNOMIALS WITH INTEGRAL COEFFICIENTS

Le Baron O. Ferguson

Results in the approximation of functions by polynomials with coefficients which are integers have been appearing since that of Pál in 1914. The body of results has grown to an extent which seems to justify the present book. The intention here is to make these results as accessible as possible.

The book addresses essentially two questions. The first is the question of what functions can be approximated by polynomials whose coefficients are integers and the second question is how well are they approximated (Jackson type theorems). For example, a continuous function \( f \) on the interval \([-1, 1]\) can be uniformly approximated by polynomials with integral coefficients if and only if it takes on integral values at \(-1, 0\) and \(+1\) and the quantity \( f(1) + f(0) \) is divisible by \( 2 \). The results regarding the second question are very similar to the corresponding results regarding approximation by polynomials with arbitrary coefficients. In particular, nonuniform estimates in terms of the modulus of continuity of the approximated function are obtained.

Aside from the intrinsic interest to the pure mathematician, there is the likelihood of important applications to other areas of mathematics; for example, in the simulation of transcendental functions on computers. In most computers, fixed point arithmetic is faster than floating point arithmetic and it may be possible to take advantage of this fact in the evaluation of integral polynomials to create more efficient simulations. Another promising area for applications of this research is in the design of digital filters. A central step in the design procedure is the approximation of a desired system function by a polynomial or rational function. Since only finitely many binary digits of accuracy actually can be realized for the coefficients of these functions in any real filter, the problem amounts (to within a scale factor) to approximation by polynomials or rational functions with integral coefficients.

This book should make the task of finding out what is known in this field significantly easier as it presents an introduction to most of the known results in the area of approximation by polynomials with integral coefficients and pointers to the literature for the rest. It is accessible to students at the graduate level and above.

Volume 17, vi + 160 pages, 1980, hard cover. List price $25.60; institutional member $19.20; individual member $12.80.

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SYMPLECTIC GROUPS

O. T. O’Meara

This volume, the sequel to the author’s Lectures on Linear groups, is the definitive work on the isomorphism theory of symplectic groups over integral domains. Recently discovered geometric methods which are both conceptually simple and powerful in their generality are applied to the symplectic groups for the first time. There is a complete description of the isomorphisms of the symplectic groups and their congruence subgroups over integral domains. The new geometric approach used in the book is instrumental in extending the theory from subgroups of \( \text{PSp}_6(n \geq 6) \) where it was known to subgroups of \( \text{PSp}_4(n \geq 4) \) where it is new. There are extensive investigations and several new results on the exceptional behavior of \( \text{PSp}_4 \) in characteristic 2.

The author starts essentially from scratch and the reader need be familiar with no more than a first course in algebra.

Volume 16, 128 pages, 1978, hard cover. List $22.80; institutional member $17.10; individual member $11.40

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NEW AMS PUBLICATIONS

CORRECTION
In the June 1980 Notices, page 372, Ralph P. Boas' name is spelled incorrectly. He was also credited with the translation of the book Functional Analysis and Number Theory rather than the paper by S. G. Mihlin. There were other translators for the other six papers contained in the book.

AMS CATALOGUE OF PUBLICATIONS
The 1980-1981 AMS Catalogue of Publications, a catalogue of AMS books and journals, is being printed this summer. Copies will be sent to libraries and book agents throughout the world. Others interested in receiving a copy may obtain one by requesting it from the Providence office of the Society, P.O. Box 6248, Providence, RI 02940, Attn. E. Nordman.

PROCEEDINGS OF SYMPOSIA
IN APPLIED MATHEMATICS
(ISN 0160-7634)

MODERN STATISTICS: METHODS AND APPLICATIONS
edited by Robert V. Hogg

This volume contains the lecture notes prepared by the speakers for the AMS Short Course given in San Antonio on January 7-8, 1980.

The choice of topics from a field as large as Statistics is a difficult one. The organizers wanted to avoid any substantial overlap with the short course on statistics held three years earlier in St. Louis; therefore it seemed very natural to begin with one important topic that is sometimes overlooked in an introductory course, particularly one in mathematical statistics. This topic is one through which the general public most often hears about statistics, namely, survey sampling. Wayne Fuller spoke on Samples and Surveys, noting the operations necessary in conducting a survey of a human population. In his article, he explains the construction of a probability sample design and the corresponding optimal estimators.

The more general problem of the design and analysis of an experiment was covered by Peter John in his Analysis of Variance. These techniques have been extremely important in applications and have also motivated a large amount of statistical research. It is clear that even in an elementary design the experimenter must understand the importance of randomization.

Nonparametric statistical methods have played a major role in modern statistics. Two coordinated talks on that subject were given by Ronald Randles and Thomas Hettmansperger. Randles introduced distribution-free rank tests, such as one by Wilcoxon, and some of their good asymptotic properties. Hettmansperger then explained how these rank tests could be used to obtain point and interval estimates for various parameters, including the regression situation. These resulting R-estimates are very robust because they are not highly sensitive to reasonable deviations from the underlying assumptions.

The important topic of regression was continued by considering isotonic regression and time series. F. T. Wright showed how to use the method of maximum likelihood to estimate ordered parameters. Then Douglas Martin considered a time sequence of data. After presenting a collection of interesting examples, he discussed appropriate models and their estimates, including robust ones.

This book provides an introduction to the statistical topics above. A background of good mathematics through advanced calculus with a little statistics is adequate preparation for enjoyment of the contents. The attentive reader will gain a fairly good understanding of the nature of survey sampling, design and analysis of experiments, nonparametric methods, isotonic regression, and time series. Modern Statistics: Methods and Applications is an excellent companion to MAA's Studies in Statistics also edited by Professor Hogg.

Volume 23, vi + 110 pages
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SELECTED TABLES
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THE DISTRIBUTION OF THE SIZE OF THE MAXIMUM CLUSTER OF POINTS ON A LINE
by Norman D. Neff and Joseph I. Naus

Researchers in many fields deal with the clustering of events in time and space. The probabilities of large clusters under various models are tools of the natural, physical and social sciences. The present book provides probabilities for the size of the largest cluster of random points on the line. Tables of exact values and functional forms are given. A wide variety of applications is given.

Those who will benefit from this volume are researchers who seek to investigate unusual clustering. These include quality control experts investigating clusters of defectives, communications engineers who design system capacity to accommodate clusters, and experts in epidemiology, traffic control, ecology and many other fields who study the clustering of events in time and space. Just as experts in these and other fields use the binomial, Poisson, negative binomial
and other distributions, the present tables are an important addition to statistical, technical and scientific libraries.

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CBMS REGIONAL CONFERENCE SERIES IN MATHEMATICS
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AN INTRODUCTION TO THE THEORY OF SPECIAL DIVISORS ON ALGEBRAIC CURVES
by Phillip A. Griffiths

In May, 1979, an NSF Regional Conference was held at the University of Georgia in Athens. The topic of the conference was “Special divisors on algebraic curves,” and at that time an informal set of lecture notes with the same title was distributed. About one-half the material in those notes contained an exposition of results from the literature, while the other part gave an account of recent joint work by Enrico Arbarello, Maurizio Cornalba, Joe Harris, and P. A. Griffiths. In writing up this monograph it was decided to restrict to a discussion of the very elementary aspects of the theory and an explanation without complete proofs of a few unpublished results together with some from the recent literature, and then to publish an expanded version of the remaining contents of the Athens notes in a more traditional research format; specifically in Special divisors on algebraic curves by the authors listed above (to appear). This monograph, then, gives an exposition of the elementary aspects of the theory of special divisors together with an explanation of some more advanced results that are not too technical. As such, it is intended to be an introduction to recent sources.

As with most subjects, one may approach the theory of special divisors from several points of view. The one adopted here pertains to Clifford’s theorem, and may be informally stated as follows: The failure of a maximally strong version of Clifford’s theorem to hold imposes nontrivial conditions on the moduli of an algebraic curve.

This monograph contains two sections, respectively studying special divisors using the Riemann-Roch theorem and the Jacobian variety. In the first section the author begins pretty much at ground zero, so that a reader who has only passing familiarity with Riemann surfaces or algebraic curves may be able to follow the discussion. The respective subtopics in this first section are (a) the Riemann-Roch theorem, (b) Clifford’s theorem and the \( \mu_0 \)-mapping, and (c) canonical curves and the Brill-Noether matrix. In the second section he assumes a little more, although again an attempt has been made to explain, if not prove, anything. The respective subtopics are (a) Abel’s theorem, (b) the reappearance of the Brill-Noether matrix with applications to the singularities of \( W_d \) and the Kleiman-Laksov existence proof, (c) the reappearance of the \( \mu_0 \)-mapping, and (d) special linear systems in low genus.

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MEMOIRS OF THE AMERICAN MATHEMATICAL SOCIETY
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ALL COMPACT ORIENTABLE THREE DIMENSIONAL MANIFOLDS ADMIT TOTAL FOLIATIONS
by Detlef Hardorp

Readers who like to follow concrete geometrical processes with their imaginations can learn from this book how to construct three transverse foliations (total foliation) for any compact orientable three manifold.

A total foliation is an example of a geometric structure on a manifold. A total foliation of an \( n \) dimensional manifold consists of \( n \) codimension one foliations that are transverse at every point. If a manifold admits a total foliation where all \( n \) foliations are transverse oriented, it is said to be totally parallelizable. A necessary condition for total parallelizability is that the manifold be parallelizable. Whether or not this is also a sufficient condition is not known.

David Tischler has proved that all oriented circle bundles over compact, oriented two dimensional manifolds admit total foliations. In this memoir, the authors proves: All compact orientable three dimensional manifolds admit total foliations.

This theorem is proven by explicitly constructing total foliations for all compact orientable three manifolds. First a suitable total foliation of the three dimensional sphere \( S^3 \) is obtained by lifting the total foliation of the Poincaré homology sphere \( Q^3 \) constructed in parts two and three of chapter five (and slightly modified in chapter six, without intertwining) to its universal cover \( \hat{S}^3 \). The total foliation is then modified by intertwining Reeb components (as described in chapter six) in one sheet of the lift such that the Reeb components intertwine as does the prepared braid, on which then surgery is performed to obtain the desired three manifold.

Because the three transverse foliations the author constructs are transverse oriented, all compact orientable three manifolds are totally parallelizable.

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TO RICKART
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RICKART C*-ALGEBRAS AND
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The connection from these rings and algebras to these groups is the Grothendieck group K0, which, for all K0~continuous regular rings and most finite RICKART C*-algebras (and in fact for homomorphic images as well), is a partially ordered abelian group with countable interpolation. Such partially ordered groups are shown to possess quite specific representations in spaces of affine continuous functions on Choquet simplices. The theme of this memoir is to develop the structure theory of these groups and these representations, and to translate the results, via K0, into properties of K0~continuous regular rings and finite RICKART C*-algebras.

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This is a collection of papers dedicated to I. M. Vinogradov.

G. I. Arhipov, A. A. Karacuba, and V. N. Čubarikov, 
An upper bound for the modulus of a multiple trigonometric sum

L. A. Balašov and S. A. Teljakovskii, Some properties of lacunary series and the integrability of trigonometric series

O. V. Besov, Intercellular averages and an error estimate for cubature formulas in Sobolev spaces and their generalizations

V. I. Blagodatskikh, The controllability problem for linear systems

B. S. Kašin, On some properties of orthogonal systems of convergence

P. I. Lizorkin, On bases and multipliers in the spaces $B_{p,0}^{a}$ (π)

E. F. Miščenko, M. S. Nikol’skiĭ, and N. Satimov, The problem of avoiding encounter in N-person differential games

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L. P. Postnikova and A. A. Judin, An analytic method for estimates of the concentration function

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S. A. Stepanov, On lower estimates of incomplete character sums of polynomials

B. S. Stečkin, Binary functions on ordered sets (inversion theorems)

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in the translation of Russian mathematics. The discussions are sufficiently general to be of interest to translators of Russian physics, chemistry, engineering, and other sciences as well.

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## Visiting Mathematicians

The list of visiting mathematicians includes both foreign mathematicians visiting in the United States and Canada, and Americans visiting abroad. Note that there are two separate lists.

### MATHEMATICIANS VISITING ABROAD

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**Backlog of Mathematics Research Journals**

Information on the backlog of papers for research journals is published in the Notices with the cooperation of the respective editorial boards.

**Backlog**: This is an estimate of the number of printed pages which have been accepted but are in excess of the number required to maintain copy editing and printing schedules.

**Observed Waiting Time**: The quartiles give a measure of normal dispersion. They do not include extremes which may be misleading. The observations are made from the latest issue published before the deadline for this issue of the Notices. Waiting times are measured in months from receipt of manuscript in final form to publication of the issue. When a paper is revised, the waiting time between an editor’s receipt of the final revision and its publication may be much shorter than is the case otherwise, so these figures are low to that extent. (Publication refers to the fact that the journal has actually been received by a subscriber in the Providence, Rhode Island area; in some cases this may be two months later than publication abroad.)
<table>
<thead>
<tr>
<th>Journal</th>
<th>Number Issues per Year</th>
<th>Approximate Number Pages per Year</th>
<th>Backlog of Printed Pages 5/31/80</th>
<th>12/15/79</th>
<th>Editor’s Estimated Time for Paper Submitted Currently to be Published (In Months)</th>
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*No response received.
**Does not include refereeing time.
***Date of receipt of manuscript not indicated in this journal.
†Jubilee issue. Almost all articles received on same day (25 months).
‡‡New journal. First issue not yet received.
Personal Items

Richard D. Anderson of Louisiana State University, Baton Rouge, has retired as Boyd Professor Emeritus from the university.

Heinz Bauer of Universität Erlangen-Nürnberg has been awarded the Chauvenet-Prize 1979 of the Mathematical Association of America. He has also been elected a Foreign Member of the Finnish Academy of Sciences.

John W. Brookes of Sacred Heart University has been appointed to a professorship.

Robert A. D'Paola of Queens College and The Graduate School and University Center, CUNY has been appointed to an associate professorship.

Irving E. Gaskill, director of the Mathematics and Computation Laboratory, Federal Emergency Management Agency, has retired from the Federal Civil Service after thirty years of service.

Bernard Osgood Koopman, Professor Emeritus of Columbia University, was awarded the George E. Kimball Medal of the Operations Research Society of America.

H. Elton Lacey of the University of Texas at Austin has been appointed professor and head of the Department of Mathematics at Texas A & M University.

Lawrence Markus of the University of Minnesota, Minneapolis, has been appointed Regents' Professor and chairman of the Control Systems Center.

Peter C. Morris of Shepherd College will teach part-time at Southern Illinois University, Carbondale, for the 1980-1981 academic year while on sabbatical leave.

Boris M. Schein of Tulane University has been appointed to a distinguished professorship at the University of Arkansas, Fayetteville.

Dan R. Scholz of Louisiana State University, Baton Rouge, has retired as Professor Emeritus from the university.

Kenneth S. Williams of Carleton University, has been appointed chairman of the Department of Mathematics and Statistics.

Deaths

Dr. Edward T. Adelson of New York, New York died on February 13, 1980 at the age of 61. He was a member of the Society for 1 year.

Nachman Aronszajn of Oregon State University died on February 5, 1980 at the age of 72. He was a member of the Society for 32 years.

Professor Emeritus Marion L. MacQueen of Southwestern University at Memphis died on May 16, 1980 at the age of 83. She was a member of the Society for 53 years.

Dr. Norman H. Ricker of the University of Oklahoma at Norman died on January 4, 1980 at the age of 83. He was a member of the Society for 54 years.

Professor Emeritus Paul A. Smith of Columbia University, died on June 13, 1980. (See page 448.)

PROCEEDINGS OF SYMPOSIA IN PURE MATHEMATICS

HARMONIC ANALYSIS
IN EUCLIDEAN SPACES

directed by Guido Weiss and Stephen Wainger

The two volumes of these Proceedings are made up of several articles that cover a large part of the considerable development in harmonic analysis in \( \mathbb{R}^n \) and related fields that occurred during the last decade. This progress resulted from the evolution of what are known as "real variable methods" and from new, important applications of the Fourier transform. Moreover, these techniques have accompanied a fruitful interaction of harmonic analysis with other branches of analysis.

The book is directed to analysts with an interest in either keeping up with the most recent research in harmonic analysis or those who are actively involved in research in this area. The background required is a working knowledge of classical harmonic analysis in Euclidean spaces plus expertise in some of the following areas: Representation theory of Lie groups, theory of functions, probability theory and partial differential equations.

Readers of these Proceedings can expect to gain a good perspective of the work being done in this type of harmonic analysis at this time. Expository articles usually precede the more technical ones in the same subject. Articles by the following authors are of an expository nature: Colin Bennett, D. L. Burkholder, R. R. Coifman, Antonio Córdoba, Björn E. J. Dahlberg, C. Fefferman, R. Fefferman, John E. Gilbert, N. Kerzman, Adam Koranyi, Yves Meyer, Benjamin Muckenhoupt, D. Phong, Robert Sharples, E. M. Stein, Mitchell H. Taibleson, Michael E. Taylor, N. Th. Varopoulos, Stephen Wainger, and Guido Weiss.

As mentioned above, the book's most significant contribution is that it does present the actual "state of the art" in real harmonic analysis, the study of Hardy spaces, harmonic functions, potential theory, the theory of one and more complex variables associated with harmonic analysis, pseudo differential operators, partial differential equations and harmonic analysis in the settings of: Probability, local fields, Lie groups and functional analysis.

The two volumes contain 102 papers. There are no other books having this scope.

Volume 35, Parts 1, 2
xxx vi + 460 pages (Part 1)
List price $26; institutional member $19.50;
individual member $13
vi + 438 pages (Part 2)
List price $24; institutional member $18;
individual member $12
Set: List price $44.40; institutional member $33.30;
individual member $22.20
Publication date: July 15, 1979

To order, please specify PSPUM/35H (set), PSPUM/35.1H (Part 1); PSPUM/35.2H (Part 2)

Prepayment is required for all American Mathematical Society publications.

Send for the book(s) above to: AMS, P.O. Box 1571, Annex Station, Providence, RI 02901.
Change of Address

Members of the Society who move or who change positions are urged to notify the Providence Office as soon as possible.

Journal mailing labels must be printed four to six weeks before the issue date. Therefore, in order to avoid disruption of service, members are requested to provide the required notice well in advance.

Besides mailing addresses for members, the Society's records contain information about members' positions and their employers (for publication in the Combined Membership Lists). In addition, the AMS maintains records of members' honors, awards, and information on Society service; information of the latter kind appears regularly in the Notices.

When changing their addresses, members are urged to cooperate by supplying the information requested below—the Society's records are of value only to the extent that they are current and accurate.

If your address has changed, or will change within the next two or three months, please place the peel-off label from the back cover (which contains your name, member code, and address) in the rectangle provided below (or on a copy of this page), supply any other information appropriate for the AMS records, and mail to the address given below.

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Place Notices label here

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Change effective as of: ________________________________

New Address: ____________________________________

New Position: ____________________________________

New Employer: _________________________________

Location: ________________

City State/Province Country Zip Code

Recent honors and awards: _______________________________ 

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Mail completed form to:
Membership Department, AMS, P. O. Box 6248, Providence, RI 02940

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Report of the Treasurer

The Treasurer this year again presents to the membership an abridged statement of the financial position of the Society, in semi-informal narrative style. A copy of the Treasurer's Report, as submitted to the Trustees and the Council, will be sent from the Providence Office to any member who requests it from the Treasurer. The Treasurer will be happy to answer any questions members may wish to put to him concerning the financial affairs of the Society.

I. A DESCRIPTION OF THE FINANCIAL POSITION OF THE SOCIETY
AS OF DECEMBER 31, 1979

The Society had cash on deposit in the Rhode Island Hospital Trust National Bank................ $ 4,426
Petty cash and drawing accounts ..................... 1,518 $ 5,944
It had investments in its agency account .............. 4,254,375
There was owing to it by members, subscribers, and others
(less allowance for doubtful accounts) ................... 277,691
It had prepaid expenses and deposits .................. 154,020
It had invested in the headquarters building, Mathematical Reviews editorial offices, a computer, and other equipment ................. 1,715,066
Making a total of current and fixed assets of ........ $ 6,407,096
The Society also held investment securities and uninvested principal cash valued at .................. 1,610,819
(The approximate market value December 31, 1979 was $1,615,854)
Total assets, therefore, were ......................... $8,017,915

Offsetting these assets, the Society had
Accounts payable ........................................ $ 747,281
Reserved unearned dues and subscriptions ............. 2,965,042
Other miscellaneous liabilities ....................... 143,462
Funds and grants received from various sources to support particular projects such as the summer institute, symposia, etc .................. $ 46,059
A surplus in its publication funds .................... 1,757,117 1,803,176
Its general fund reflected a surplus balance of ........ 748,135
Thus, accounting for all the current funds ............ $ 6,407,096

The invested funds represent the following:
The Endowment Fund, largely the gifts of members ...... 100,000
Robert Henderson Endowment Fund .................... 548,223
Joseph Fels Ritt Memorial Fund ....................... 22,521
The Library Proceeds Fund, derived from the sale of the Society's library in 1959 .................. 66,000
The various prize funds .................................. 162,570
Dues and publication reserve fund ..................... 98,382
Mathematical Reviews subscription reserve fund ........ 80,000
II. AN ACCOUNT OF THE FINANCIAL TRANSACTIONS OF THE SOCIETY 
DURING THE FISCAL YEAR ENDED DECEMBER 31, 1979

The Society has two types of receipts: funds for special purposes and projects; and general funds, from which are met the general operating expenses, including the publication of *Abstracts*, the *Bulletin*, the *Proceedings*, *Mathematics of Computation*, the *Notices*, *Current Mathematical Publications*, *Mathematical Reviews*, and the *Transactions*.

To meet its general obligations, the Society received from

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dues and contributions of individual members</td>
<td>$ 493,459</td>
</tr>
<tr>
<td>Dues of institutional members</td>
<td>183,250</td>
</tr>
<tr>
<td>Dues of corporate and associate members</td>
<td>5,350</td>
</tr>
<tr>
<td><strong>Total general receipts</strong></td>
<td>682,059</td>
</tr>
</tbody>
</table>

Less amount allocated to *Notices* and *Bulletin* | $ 311,923 |

Sales of Society journals                        | 3,243,423 |
Investments and trusts                           | 466,196   |
Publication contributions                        | 72,695    |
Miscellaneous sources                            | 23,191    |
**Total general receipts**                       | 4,117,428 |

These funds were expended for

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publication of Society journals</td>
<td>3,406,029</td>
</tr>
<tr>
<td>Net transfers to special and publication funds, including support of membership services and costs of meetings</td>
<td>212,852</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>173,902</td>
</tr>
<tr>
<td><strong>Total general expenses and transfers</strong></td>
<td>3,792,783</td>
</tr>
</tbody>
</table>

Net Income added to general funds                | $ 324,645 |

Respectfully submitted,

FRANKLIN P. PETERSON
Treasurer
AMS Composition of Mathematical Text

This is a report on some recent and near-future developments in the headquarters office of the Society in Providence and in the Mathematical Reviews editorial office in Ann Arbor. Of the various stages involved in transforming a mathematician's manuscript into a printed page of mathematics, the most radical changes are the result of the application of computer technology to the problem of "composing" a page, i.e., finding all the needed characters and positioning them properly to produce the display which is to be printed. With the help of a sizable investment in computer hardware and programs, the Society's production costs are being brought down (or held down, in the face of inflation), while processing time is being reduced and the quality of the final product is being improved.

For a number of years the Society has been using a commercial composition system, on our own computer, to compose the Transactions, Proceedings, the long articles in the Bulletin, and a number of books. Such a system makes it possible for a keyboarder to type instructions on an ordinary typewriter keyboard which will eventually make an electronic typesetter print Greek, italic, Cyrillic and boldface letters, as well as the many special mathematical symbols, and then arrange all these characters on the page so that one sees intelligible mathematics. The necessary collection of programs is large and intricate, and requires a fairly large computer.

About three years ago the Mathematical Reviews Editorial Committee and the editors began a serious effort to computerize the preparation of that journal. Foreseeing the imminent need for a new cumulative index, their first step was to create a machine-readable record, or file, of the bibliographic headings for items reviewed, and to do the programming necessary to be able to use this file to produce author indexes and subject indexes. This file was created for current issues in the 1978 volumes. Since there was no such record for the years 1973-1977, that material had to be separately input; the result is that volume and annual indexes have been computer composed since 1978, and the 1973-1979 Cumulative Index, containing both author and subject sections, will appear near the end of this year.

While this development was under way, the cost of commercial composition of the text of the reviews themselves was soaring, and it became apparent that it would be less expensive to do this operation in-house also. With more programming and a larger computer this became feasible, and by the July 1979 issue the entire composition job was being done by Society staff. (The final tape was, and still is being, sent to a commercial concern for processing through a typesetter, to produce the camera copy that is sent to the printer.) Extraordinarily large issues of Mathematical Reviews have been appearing lately, as a result of a catch-up effort to include all old material in 1979 volumes so that the cumulative index would be as complete as possible. A substantial increase in the Society's staff has thus been required in both Providence and Ann Arbor to input both textual and bibliographic material, but this has not affected the per-page saving in cost. In fact, the contrary has happened: with the still larger computer recently purchased on which all inputting and correcting can be done on terminals rather than in batch processing, as well as the more powerful collection of programs for handling composition problems, the cost per page of composition of those Society journals handled on the computer has decreased somewhat, in spite of inflation. Of course, there are many other costs involved besides composition—editorial preparation and proofreading, typesetting, printing, binding and distribution—and the first of these especially is highly labor-intensive, so that the eventual subscription or purchase price is affected only to a limited extent by savings in composition costs.

Now that issues of Mathematical Reviews are returning to their heretofore-normal size, there is excess capacity available for the composition function in the Providence office. This will be absorbed to some extent if present plans materialize for composing on the computer a number of AMS journals which are still prepared on sophisticated electric typewriters. Also, the Society is already doing the composition of one journal for another organization, and it is to be expected that other journals will avail themselves of this service, as editors and publishers become aware of the savings that can be achieved by using it.

It is expected that in 1981 a new composition system called \TeX (pronounced tech) will be brought into full operation. This system, created by Donald Knuth, will have several advantages over the one now in use. A variety of fonts will be available for the English text in a manuscript, as contrasted with the single Times Roman font to which the journals produced on the computer are now restricted. The designing of new alphabets and mathematical symbols will be much simpler than it has ever been in the past, using Knuth's companion system, called Metafont, for the computer-assisted creation of characters that can be output on an electronic typesetter. Furthermore, it is possible with \TeX to make up multiple-column pages, complete with running heads and page numbers, while the sys-
tem currently in use produces only long columns of text, and it is expected that this will result in still further cost savings.

Recently the Society has purchased a small printing press, an automatic collator, and a paperback binder. This new equipment enables the staff to do the printing and binding of short runs of books and journals, and probably eventually all the Society's publications in soft cover will be produced entirely in-house with the exception of the Notices, Bulletin, Combined Membership List, and Mathematical Reviews. (The Society also now has its own typesetter, to be used in conjunction with \TeX .) Here again, cost savings are being achieved.

Finally, there is a more distant goal in sight. There is no reason in principle that mathematicians themselves, or technical typists in a university department, could not prepare manuscripts in the \TeX language on an ordinary terminal. (The actual \TeX program is in the public domain, and can be used by anyone having access to the requisite computer power.) Xerographic printers are already on the market which, with suitable interface programs, could read such a tape and produce a proof-quality copy of the composed page, which the author could correct until it was exactly what he or she wanted, and the final tape could then be sent to the Society or another publisher which uses the \TeX system, for typesetting. This would eliminate approximately half the cost of publishing a journal, since most of the work which involves editorial personnel in the preparation of manuscripts and proofreading of galleys could be eliminated. The cost of such a printer is still too high (about $20,000) for many universities to accept, and the necessary software is not yet easily available, but no doubt both problems will be ameliorated with the passage of time.

In summary, it is clear that publication costs can be kept down with the help of modern composition technology and printing-industry equipment, and editors and publishers of journals should be aware of this fact.

A description of Knuth's system is given in his book \TeX and Metafont, copublished by the Society and Digital Press. A \TeX Users' Group has been formed, and information about it can be obtained by writing to TUG, American Mathematical Society, P.O. Box 6248, Providence, RI 02940.

William J. LeVeque

Editor's Note: The above report was composed using \TeX and set on the Society's new typesetter.

TEX and METAFONT
New Directions in Typesetting
Donald E. Knuth

The \TeX Manual describes in Knuth's inimitable style a new system for technical typesetting which makes possible, and even easy, composition and typesetting of the most complex scientific displays of difficult mathematical notation by authors and technical typists.

METAFONT, a system for alphabet design, is Knuth's solution to the problem of limited character sets on raster-based typesetting machines. Like \TeX, it is a tool for simplifying technical typesetting and is designed to prepare alphabets and special characters to be used by \TeX. The \TeX and METAFONT systems, being implemented in PASCAL, are in the public domain and available to all who typeset.

This volume, containing manuals for both systems, introduces \TeX and METAFONT to anyone concerned with typesetting*. Only a knowledge of high school mathematics is required to master the systems.

Foreword by Gordon Bell.
December 1979, 360 pages, illustrated, indexed, paperback — $12.00**
Co-published by Digital Press and the American Mathematical Society

Send orders to
DIGITAL PRESS
Department AMS, Educational Services
Digital Equipment Corporation
12A Esquire Road
North Billerica, MA 01862

* Part I is a reprint of the Gibbs Lecture given in January 1978, and Part II is a reprint of \TeX, A Manual for Technical Text. Part III, METAFONT, has not been previously published.
** Price applies to U.S. only. Contact the nearest office of Digital Equipment Corporation, Educational Services, for prices outside the U.S. On prepaid single orders, individual members of the AMS are entitled to a 50% discount; institutional members to a 25% discount on orders for 1 to 5 copies. A 10% discount is extended to all other customers ordering two or more copies. Add $1 for postage and handling unless the order is prepaid.
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Terms expire on December 31 of the year given unless otherwise specified.

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Publisher: Robert L. Wilson 1982

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1980
1980
1980
1980
1982
1982

1981
1980
1981
1981
1980
1982

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Felix E. Browder 1983

U.S. National Committee on Theoretical and Applied Mechanics

(Term expires on October 31)

Louis N. Howard 1980
Reports of Meetings

THE APRIL MEETING IN DAVIS

The seven hundred seventy-seventh meeting of the American Mathematical Society was held at the University of California, Davis, California, on Friday and Saturday, April 25 and 26, 1980. There were 157 registered at the meeting, including 129 members of the Society.

By invitation of the Committee to Select Hour Speakers for Far Western Sectional Meetings, there was an invited hour address given by JAMES P. LIN of the University of California, San Diego. He spoke on The topology of finite H-spaces, and was introduced by P. Emery Thomas.

By invitation of the same committee, there were six special sessions of selected papers. The topics and the names of the organizers (who are all at the University of California, Davis) are as follows:

- Differential equations in engineering, DALLAS O. BANKS. The speakers were Subir Kumar Dey, Omar Hijab, Cornelius O. Horgan, Frederick A. Howes, Anil K. Jain, Al Kelley, Robert E. O'Malley, Jr., John C. Neu, Milton Van Dyke, and Stephen Whitaker.

- Combinatorial geometry and convex sets, DAVID W. BARNETTE and GULBANK D. CHAKERIAN. The speakers were Ralph Alexander, Anders Björner, Marilyn Breen, William J. Firey, Jacob Eli Goodman, Helmut Groemer, Branko Grünbaum, David C. Kay, Victor Klee, John R. Reay, John E. Wetzel, and Joerg M. Wills. A problem session included a presentation of problems by Paul Erdős.


- Mathematics education, EVELYN MARIE SILVIA. The speakers were Wilson Brumley, James R. Diederich, Jerry Goldman, Leon A. Henkin, David E. Logothetti, F. Reif, Elaine K. Rooyene, Jane R. Sanguine-Yager, Alan H. Schoenfeld, Jean S. Simutis, Julian Weissglass, and Margariete Montague Wheeler. Professor Charles Wales of West Virginia University spoke on Guided design; his presentation was university-sponsored in cooperation with the special session on Mathematics Education.


There were two sessions of contributed ten-minute papers, chaired by Donald Norton and Sherman K. Stein.

Local arrangements were well taken care of by David W. Barnette and Kenneth A. Ross, Eugene, Oregon.

Contemporary Mathematics

CALL FOR PAPERS

The AMS is starting a new soft-cover book series that will be published in the shortest possible time after receipt of an accepted manuscript. The cost will be kept very low so that copies can be afforded by individuals.

The series will include proceedings of a conference, whether or not sponsored by the Society, or lecture notes submitted by an individual author. As is the case with the proceedings of certain symposia, camera-ready copy for the papers may be prepared either by the authors or the Society. In the former case the Society will pay a typing fee of $5 or more per page, depending upon the number of lines to the inch, and will provide model paper and typing instructions.

The manuscripts will be refereed by an editorial board, with proceedings of a conference being regarded as a unit. Acceptance might therefore precede a conference and be based upon the identity of the sponsor or organizing committee.

Typescripts or preprints of papers for this new series should be submitted to Professor James Milgram, Department of Mathematics, Stanford University, Stanford, California 94305, for transmission to the editors.
EMPLOYMENT INFORMATION IN THE MATHEMATICAL SCIENCES

SUBSCRIPTION FORM FOR INSTITUTIONAL SUBSCRIBERS

The American Mathematical Society and the Mathematical Association of America publish EMPLOYMENT INFORMATION IN THE MATHEMATICAL SCIENCES six times each academic year: November, January, March, May, July, and August.

On preprinted forms that are mailed every other month, department heads are asked to provide information (by a specified deadline) on open positions, or to state that there are none. The announcement that no positions are open may relieve the department of the obligation to answer letters from applicants, thus decreasing the burden of correspondence. Each issue contains descriptions of open positions in academic departments in the U.S. and Canada, a list of academic departments without positions, a list of academic departments not responding, descriptions of government, industrial and other nonacademic positions in the U.S. and Canada, as well as descriptions of positions available in foreign countries.

The following resolution was passed on October 25, 1974 by the Council of the American Mathematical Society: "The Council of the AMS adopts the principles that all positions in the mathematical sciences shall insofar as practicable be advertised, and that the standard place for the advertisements to appear is the publication EMPLOYMENT INFORMATION."

Institutions may enter subscriptions at any time during the subscription year; the subscription will expire after six issues. The chart below gives the deadlines for receipt of orders.

<table>
<thead>
<tr>
<th>Subscriptions beginning with</th>
<th>Subscriptions expire with</th>
<th>Deadline for receipt of orders</th>
<th>Issue mailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>November issue</td>
<td>August issue</td>
<td>October 15, 1980</td>
<td>November 4, 1980</td>
</tr>
<tr>
<td>March issue</td>
<td>January issue</td>
<td>February 15, 1981</td>
<td>March 5, 1981</td>
</tr>
<tr>
<td>May issue</td>
<td>March issue</td>
<td>April 15, 1981</td>
<td>April 30, 1981</td>
</tr>
</tbody>
</table>

Issues are sent by first class mail to subscribers in the United States, Canada and Mexico. Issues are sent by airmail to other countries.

Check one:

- [ ] U.S. universities with the 27 highest ranked departments of mathematics (See page 325, August 1978 NOTICES.) $96.00
- [ ] Other universities in the U.S. or Canada offering doctoral degrees in the mathematical sciences 72.00 $81.60
- [ ] Other colleges and universities in the U.S. or Canada, non-academic and foreign institutions 60.00 69.60

Prepayment is required. Make checks payable to the American Mathematical Society and mail to P. O. Box 1571, Annex Station, Providence, Rhode Island 02901.

Amount enclosed $____________

Ordered by: __________________________ Ship to: __________________________

INSTITUTION __________________________

TITLE/DEPARTMENT __________________________

ADDRESS __________________________

CITY __________________________

STATE/PROVINCE __________________________

ZIP/CODE __________________________

474
EMPLOYMENT INFORMATION IN THE MATHEMATICAL SCIENCES

SUBSCRIPTION FORM FOR INDIVIDUAL SUBSCRIBERS

The American Mathematical Society and the Mathematical Association of America publish EMPLOYMENT INFORMATION IN THE MATHEMATICAL SCIENCES six times each academic year: November, January, March, May, July, and August.

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Six issues are published during the academic year, beginning with the November issue. Subscription rates are prorated for late orders. Single copies are not available except for the final issue, and back issues are not available. The chart below gives complete information on individual subscription rates for both employed and unemployed individuals. Issues are sent by first class mail to subscribers in the United States, Canada, and Mexico. Issues are sent by airmail to other countries.

<table>
<thead>
<tr>
<th>Beginning with</th>
<th>FIRST CLASS MAIL</th>
<th>AIR MAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Employed</td>
<td>Unemployed*</td>
</tr>
<tr>
<td>November</td>
<td>$30.00</td>
<td>$15.00</td>
</tr>
<tr>
<td>January</td>
<td>25.00</td>
<td>12.50</td>
</tr>
<tr>
<td>March</td>
<td>20.00</td>
<td>10.00</td>
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<tr>
<td>May</td>
<td>15.00</td>
<td>7.50</td>
</tr>
<tr>
<td>July</td>
<td>10.00</td>
<td>5.00</td>
</tr>
<tr>
<td>August</td>
<td>5.00</td>
<td>2.50</td>
</tr>
</tbody>
</table>

All individual orders expire with the August issue.

Prepayment is required. Make checks payable to the American Mathematical Society and mail to P. O. Box 1571, Annex Station, Providence, Rhode Island 02901.

Check one

[ ] Individual rate, begin with issue

[ ] Unemployed rate*, begin with issue

Amount Enclosed

$_____

PLEASE PRINT

NAME__________________________________________________________

ADDRESS_______________________________________________________

CITY__________________STATE/PROVINCE____________________ZIP/CODE_______

*To qualify for this rate please complete the following form:

I am currently unemployed and actively seeking employment. My unemployed status is not the result of voluntary resignation or retirement from my last positions. I am not enrolled in a graduate study program.

(name—please print)
SUGGESTED USES for classified advertising are books or lecture notes for sale, books being sought, positions available, situations wanted, summer or semester exchange or rental of houses, mathematical typing services and special announcements of meetings.

THE RATE IS $3.00 per line. To calculate the length of an ad assume that one line will accommodate 52 characters and spaces. The same ad run in seven consecutive issues is $17.50 per line. Ads will be typed in the AMS office and will be typed solid. If centering and spacing of lines is requested, the charge will be per line with the same rate for open space as for solid type.

DEADLINES are listed on the inside front cover.

U. S. LAWS PROHIBIT discrimination in employment on the basis of color, age, sex, race, religion or national origin. "Positions Available" advertisements from institutions outside the U. S. cannot be published unless they are accompanied by a statement that the institution does not discriminate on these grounds, whether or not it is subject to U. S. laws. Details and specific wording may be found on page 100 of the January 1980 Notice.

SITUATION WANTED advertisements are accepted under terms spelled out on page A-355 of the April 1979 Notice. (Deadlines are the same as for other classified advertisements.)

SEND AD AND CHECK TO: Advertising Department, AMS, P. O. Box 6248, Providence, Rhode Island 02940. Individuals are requested to pay in advance, institutions are not required to do so.

POSITIONS AVAILABLE

DEPARTMENT HEAD

MATHEMATICAL AND COMPUTER SCIENCES

MICHIGAN TECHNOLOGICAL UNIVERSITY

Nominations and applications are invited for an outstanding individual to head the Department of Mathematical and Computer Sciences.

The Department has a faculty of 40, offers undergraduate and graduate programs, and provides a large number of service courses to other colleges and departments.

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