

MARYLAND—DISTRICT OF COLUMBIA— VIRGINIA SECTION OF THE MAA NEWSLETTER

Vol. 7, No. 2

Editor: John Milcetic

Oct. 1985

MONTGOMERY COLLEGE MEETING

The Fall meeting of the MD-DC-VA section of the MAA will be held at the Rockville campus of Montgomery College on November 15-16. See the accompanying map for directions to the campus.

FRIDAY BANQUET AND SPEAKER

From 6:30-7:30 pm on Friday evening there will be a cocktail hour preceding the banquet which will be in the Fine Arts Building. Beer and wine will be available for purchase. In addition there will be platters of raw vegetables, fruit and cheese as well as punch. The banquet dinner consists of Cornish hens and rice, beef burgundy and rice, honey glazed carrots, rolls and butter, assorted pies, coffee and tea. The cost for the dinner is \$14. If you are planning to attend, please mail your reservations so as to be received by Ray Hancock no later than November 8. We must give ample notice to the caterers.

Dr. Harry W. McLaughlin will address the section at the banquet. He is a professor at Rensselaer Polytechnic Institute where he has taught since 1967. His appointment is in the Center of Interactive Computer Graphics, the Department of Mathematical Sciences and the Department of Computer Science. He received his PhD from the University of Maryland in 1966 and taught one year at the University of California, Riverside, before joining the faculty at RPI. For the past four years he has been interested in geometric modeling motivated by his work in the Center for Interactive Computer Graphics. During the period May-December, 1984, he visited l'École Polytechnique Fédérale de Lausanne where he lectured on geometric modeling. He has since lectured in Germany, England and France on this topic. He is also very active in SIAM and did much work for a SIAM conference on geometric modeling and robotics.

An abstract of his talk follows:

Applied Mathematics in Design: the role of Graphics
The computer is currently changing the role of the Applied Mathematics Community. The applications of some topics in applied mathematics to design problems and how the use of Computer Graphics enters into the design procedure will be discussed and demonstrated.

SATURDAY SPEAKER

Dr. Stephen B. Maurer will address the section on Saturday, November 16. He is an Associate Professor of Mathematics at Swarthmore College, where he has taught since 1979. He grew up in Silver Spring, Maryland. He received a B. A. from Swarthmore in 1967 and a Ph. D. at Princeton in 1972. His previous teaching positions were at Princeton, the University of Waterloo, Hampshire College and the Phillips Exeter Academy. Although his major scholarly interest has been research and curricular development in discrete mathematics, he has also made forays (sometimes continuous) into mathematical biology, economics and anthropology. He is an MAA Visiting Lecturer, Chairman of the MAA Committee on High School Contests and a member of the CUPM. During 1982-84 Professor Maurer was a consultant to the Alfred P. Sloan Foundations where he promoted curricular projects.

The following is an abstract of Dr. Maurer's talk.

WHAT IS DISCRETE ALGORITHMIC MATHEMATICS?

What is discrete mathematics? -- most mathematicians now have a pretty good idea of the answer to that. But what does the addition of the word "algorithmic" mean? -- that's not so clear. I will attempt to make it clear by asking a few typical discrete problems and contrasting algorithmic and nonalgorithmic ("classical") solutions to each one.

DISCRETE MATHEMATICS MINICOURSE

A three hour minicourse in discrete mathematics will be given by Dr. Walter Meyer on Friday afternoon November 15 from 3:30 - 6:30. Selected examples will be presented to illustrate some reasonable objectives of a discrete mathematics course. A general "road map" of the territory will be presented in which a variety of potential topics in such a course will be mentioned. A bibliography and some handouts will be available. Preregistration is mandatory. Participation is limited to 40, so register early. The cost will be \$10. Additional information may be obtained by calling or writing Elizabeth J. Teles (Montgomery College, Takoma Park, Maryland 20912, (301)-587-4090).

Dr. Walter Meyer is a Professor of mathematics at Adelphi University in New York. He is currently taking a leave of absence from Adelphi to serve as a Senior Systems Designer for Grumman Data Systems. He received a Ph. D. in mathematics from the University of Wisconsin in 1969. He is the author of two textbooks and a variety of expository and research articles as well as being a script consultant for a TV series in mathematics. He was the professor for the Discrete Mathematics course at the AMATYC Summer Institute at Rick's College during August 1985. This institute was funded by the Sloan Foundation as part of their continued interest in mathematics.

HOTEL/MOTEL RESERVATIONS

You should make your own reservations. We have the following special arrangements. When calling for reservations, be sure to mention that you are part of the MAA group meeting at Montgomery College.
Colonial Manor Inn (approximately fifteen minute drive to campus)
11410 Rockville Pike
Rockville, Md. 20852

Toll free: 800-752-3800

Maryland : 301-881-5200

A special rate of \$43 + 10% tax includes one room with two double beds and a maximum of four people. We need 10 or more rooms for this special rate.

Days Inn (approximately five to ten minute drive to campus)

16001 Shady Grove Road

Rockville, Md. 20850

Toll free: 800-325-2525 (not for special rates)

Maryland : 301-948-4300

Group rate of \$41 + 10% tax per room will apply if we reserve five or more rooms by November 8. Contact Pamela Kane.

Town Centre Inn (approximately five minutes to campus)

254 N. Washington St.

Rockville, Md. 20850-1796

Phone: 301-424-0100

If there are ten or more registrations, there are group rates available of \$40 + tax (single) and \$44 + tax (double or king).

Ramada Hotel (approximately 10 minutes to campus)

1251 W. Montgomery Ave.

Rockville, Md. 20850

Toll free: 800-228-2828 (not for group rate)

301-424-4940

Group rate of \$48 + tax if there are at least ten rooms reserved.

FROM THE CHAIRMAN

In response to the article by Douglas Nance in the September issue of FOCUS, a forum will be held during our November meeting to discuss the question of whether the section should become involved in state or district educational issues. Anyone with an opinion on this question is invited to participate and express an opinion on this matter. See the program elsewhere in the newsletter for the location and time of the forum.

Also scheduled for this meeting is the Section Premier of three new TEAM videotapes: Satellite Communication Systems, Loan Insurance Analysis and The Statue of Liberty. The tapes will be shown continually throughout the meeting, so take some time to have a peek.

Also please try to stop by and visit our vendor(s) during the course of the meeting. At press time we have but one vendor, Computer Science Press. Your interest in their display might encourage their further support of our section meetings.

I am pleased to announce the following appointments. Caren Diefenderfer (Hollins College, Hollins College, Virginia 24020, (703)-362-6542) has agreed to chair the Nominating Committee. In addition, Fred Gooding Jr. of Goucher College will be our section representative to COPE, the Committee on Placement Examinations. Any questions or comments you have concerning the Placement Exams may be addressed to Fred.

I look forward to seeing you at the meeting.

UPCOMING EXAMS

The 37th American High School Mathematics Exam will be held on February 25, 1986. Anyone interested in helping our Regional Exams Coordinator should contact Sally Garber (P. O. Box 9587, Hollins College, Virginia 24020). In addition the dates for the American Invitational Mathematics Examination and the USA Mathematical Olympiad are March 18, 1986 and April 23, 1986, respectively.

The MAA Committee on the American Mathematics Competitions announces the institution of a new exam, the American Junior High School Mathematics Exam which will be held on December 10, 1985. This exam joins the others mentioned above which are recognized throughout the USA, Canada and abroad as being of exceptional quality, complementary to the instruction of classroom teachers and significant to the development of problem solving ability of the participants. Please contact Sally Garber if you have an interest in helping out.

IFRICS

The Institute for Retraining in Computer Science (IFRICS) announces the dates of its summer program: at Clarkson University from June 2 - August 1 and at Kent State University from June 16 - August 15. Interested candidates should write for more information and application forms to the director of either campus: Ed Dubinsky, IFRICS Director, Department of Mathematics and Computer Science, Clarkson University, Potsdam, New York 13676, (315) 268-2382 or Darrell Turnidge, IFRICS Director, Department of Mathematical Sciences, Kent State University, Kent, Ohio 44242, (216) 672-2077.

CORRECTION

An incorrect zip code was printed for Elizabeth Teles in the list of officers in the last newsletter. The correct address is Montgomery College, Takoma Park, Maryland 20912.

The Maryland - District of Columbia - Virginia Section of
The Mathematical Association of America

Fall Meeting
Friday November 15 and Saturday November 16, 1985
Montgomery College
Rockville, Maryland

Friday November 15, 1985

3:30 - 6:30
Room 122
Science West

Discrete Mathematics Minicourse
Dr. Walter Meyer
Adelphi University and Grumman Data
Systems

Advance registration required by November 8.
Preregistration form on the last page.
Details available in the newsletter.

6:30
Fine Arts
Auditorium

Cocktail hour, banquet, and speaker

INVITED ADDRESS

"Applied Mathematics in Design: The
Role of Graphics"

Dr. Harry W. McLaughlin
Rensselaer Polytechnic Institute

Advance registration required by November 8.
Preregistration form on the last page.
Details available in the newsletter.

Saturday November 16, 1985

All talks and meetings will be held in the Humanities building.

8:00 - 11:00
12:30 - 1:00
Humanities 228

Registration

8:30 - 11:00
Humanities 227

Coffee and donuts available

8:40
Humanities 18

"Welcoming Remarks"

Cliff Wood, Instructional Dean for
Mathematics and Physical Sciences,
Montgomery College, Rockville

9:00 Humanities
213

"An Algorithmic Study of Latin Squares
and Frequency Squares"
Larry J. Brant, National Institute of
Health, National Institute on Aging

229

"Some First Hand Observations of Mathematics
Education in the Soviet Union"

Daniel Benice, Montgomery College Rockville

314

"Homotopy Continuation Methods for Satellite
Trajectory Estimation"

Richard Smith, Computer Sciences Corp.

330

"Singularities of Jacobi Series Expansions
in Two Complex Variables"

Peter McCoy, U. S. Naval Academy

225

TEAM Tape "Loan Insurance Analysis" (1 Hour)

9:30 Humanities
213

"Report of Discrete Mathematics Workshop
sponsored by AMAYTC and the Sloan Foundation"
Elizabeth Teles, Montgomery College,
Takoma Park

229

"Teaching the General College Mathematics
Student About Algebra in One Week"

Thomas Sonnabend, Trinity College

314

"Vibrations of a Nonlinear String"

Reza Malek-Madani, U. S. Naval Academy

330

"Moments of Spheres by Symmetry"

Bruce Parry, EPL Analysis

10:00 Humanities
213

"Discrete Mathematics with Finite Difference
Equations" ONE HOUR PRESENTATION
James T. Sandefur, Georgetown University

229

"Building Math Confidence"

Margaret Aldrich, Anne Groves, Robert Wiley
Montgomery College, Takoma Park

314

"Vibrating Springs and Strings and Things"

Howard Penn, U. S. Naval Academy

330

"Characteristic Classes of Foliations"

Ira Koskowitz, Center for Naval Analyses

225

TEAM tape "Statue of Liberty" (1 Hour)

10:30 Humanities	
213	10:00 presentation continued
229	"Which Card to Lead?" Craig Bailey, U. S. Naval Academy
314	"Envelopes Via the PC" William Sanders, James Madison University
330	"Positive Integer Solutions of the Descartes Circle Equations" William J. Berger, University of D.C.
11:00 Humanities	
18	MAA Business Meeting
11:00 Humanities	
225	Team Tape, "Satellite Communications Subsystems" (1 Hour)
11:30 - 1:00	LUNCH A list of nearby restaurants will be available at the registration desk.
12:00 - 1:00	
Humanities 225	TEAM Tape "Loan Insurance Analysis"(1 Hour)
228	Registration for latecomers
1:00 Humanities	
18	INVITED ADDRESS 1 Hour Presentation "What is Discrete Algorithmic Mathematics?" Dr. Stephen Maurer, Swarthmore College Details available in the newsletter.
2:00 Humanities	
213	"Mathematics Curriculum of the First Two Years: A Report from the Sloan-Funded Schools and Others" Martha Siegel, Towson State ONE HOUR PRESENTATION
229	"The Experience and the Product of a COMAP Winner - Modeling in Animal Populations" Mike Caulfield, John Kent, Dan McCaffrey Students John August, Advisor Mount Saint Marys' College
314	"Loops in 4-Regular Plane Graphs" Bruce Richter, U. S. Naval Academy
330	"The Maximum Power Transfer Theorem Without Calculus" Robert Maynard, Tidewater Community College
225	TEAM tape "Statue of Liberty" (1 Hour)

2:30	Humanities	2:00 presentation continued
	213	
	229	"Modeling Io's Volcano" Bernice Kastner, University of Maryland
	314	"Representation of Certain Integers in Terms of Sums of Lucas Numbers" Herta Frietag, Hollins College
3:00	Humanities	
	213	"Programmable Programming Discrete Mathematics" Robert Krzywiec ONE HOUR PRESENTATION
	229	Open Forum: "Should Our Section Become Involved in Issues Relating to Elementary and High School Math Education?" Robert Lewand, Goucher College, Moderator
	314	"Some Applications of Pure Mathematics at the Census Bureau" Mary Mulry-Liggan, Bureau of Census, Statistical Research Division 45 Minute PRESENTATION
	225	TEAM Tape "Satellite Communications Subsystems" (1 Hour)

The new TEAM (Teaching Experiential Applied Mathematics) will be shown
throughout the day. See the program for times.

ADDENDUM

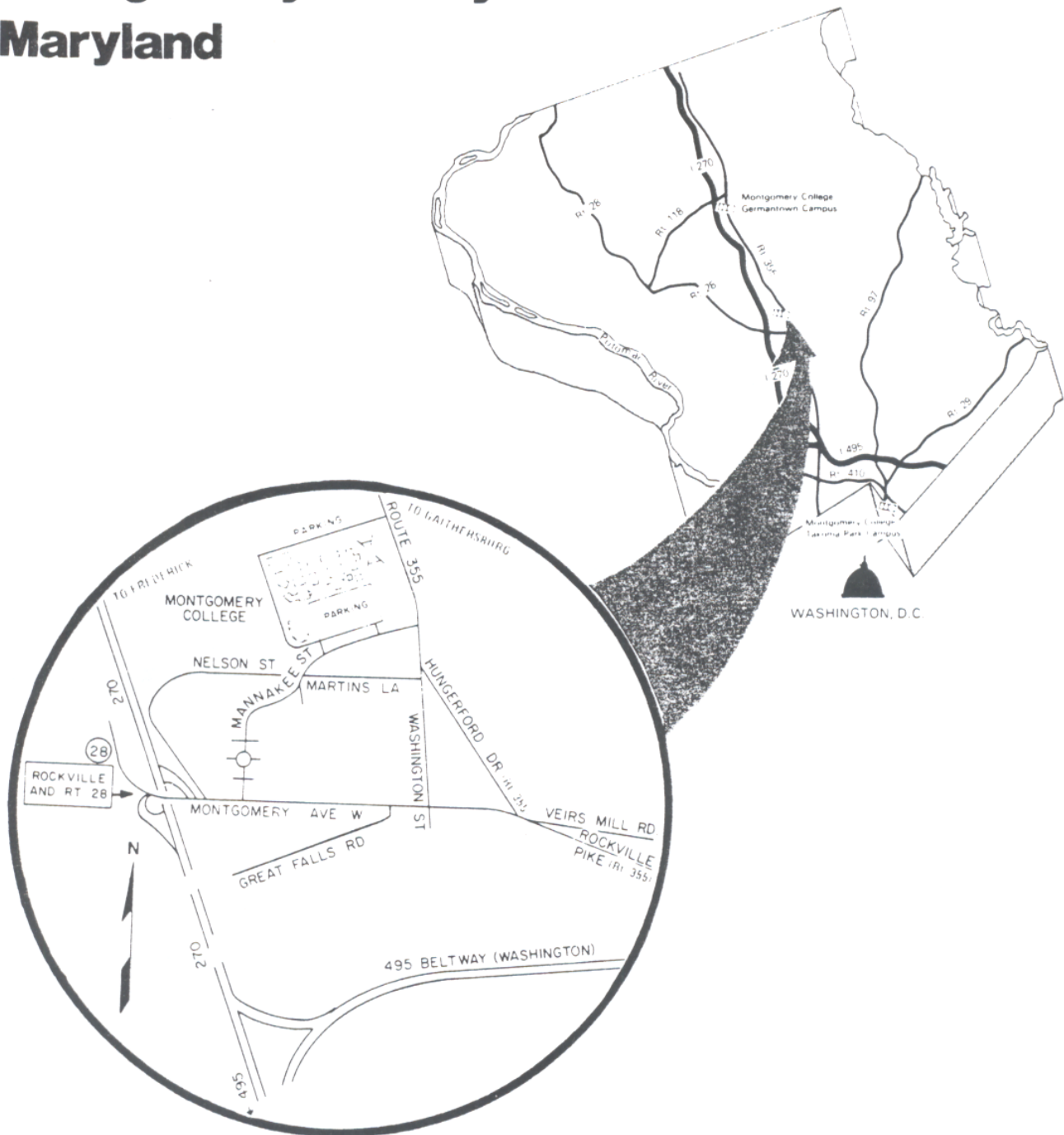
2:30	330	"On the possible orders of integer matrices" Bob Hanson, James Madison University
3:00	330	"A result on Symmetric polynomials" Klaus Fischer, George Mason University

Abstracts for Talks

1. "An Algorithmic Study of Latin Squares and Frequency Squares" Larry J. Brant
After defining the discrete mathematical structure of Latin squares and frequency squares, a brief introduction to each type square is given, followed by a discussion of the importance of both types of squares. Several theoretical results as well as several computational results obtained through the use of computerized algorithms are presented.
2. "Some First Hand Observations of Mathematics in the Soviet Union" Dan Benice
Slides will be shown along with a discussion of a trip to the Soviet Union with mathematics educators from the United States during the spring of 1985.
3. "Homotopy Continuation Methods for Satellite Trajectory Estimation" Richard Smith
This method of solution has been extensively tested using satellite-to-satellite tracking observations obtained with NASA's Tracking and Data Relay Satellite System. Some of the numerical results and solution curves that were computed are presented here.
4. "Singularities of Jacobi Series Expansions in Two Complex Variables" Peter McCoy
The classical theorem of Gabor Szego (1954) relates the singularities of real zonal harmonic expansions with those of associated analytic functions of a single complex variable. Zeev Nehari (1956) developed the counterpart for Legendre series on the C-plane by generalizing Szego's theorem. This paper identifies the singularities of analytic symmetric Jacobi series on C with those of analytic functions in the sense of Szego and Nehari.
5. "Report of Discrete Mathematics Workshop Sponsored by AMATYC and the Sloan Foundation" Elizabeth Teles
In August of this year a workshop in discrete mathematics was held at Ricks College in Rexburg, Idaho for teachers of two year college mathematics. Topics and results from this workshop will be discussed.
6. "Teaching the General College Mathematics Student About Algebra in One Week" Thomas Son nabend
These lessons examine algebra as a mathematical language, show the power of variables and formulas, and present some common applications.
7. "Vibrations of a Nonlinear String" Reza Malek-Madani
8. "Moments of Spheres by Symmetry" Bruce Parry
The unitary invariance of p-dimensional surface measure on S , the unit sphere, and Bessel's equality provide a moderately painless way of evaluating moments on S .
9. "Discrete Mathematics with Finite Difference Equations" James T. Sandefur
The topics of discrete mathematics can be unified by the use of finite difference equations. Notes from a text that Dr. Sandefur is now writing, different from those currently on the market, have been used in his courses at Georgetown ranging from upper level undergraduate to advanced high school courses for students. Topics from a mini-course that he will be giving at the MAA meeting in New Orleans in Discrete Math will also be discussed.
10. "Building Math Confidence" Margaret Aldrich, Anne Groves, Robert Wiley
This will be a brief description of a course for the math anxious. The presentation and demonstrations will include discussion of course content, methods of team teaching, characteristics of students, and results of course evaluations.
11. "Vibrating Springs and Strings and Things" Howard Penn
A computer graphics demonstration on the IBM-PC of the vibrating string and vibrating spring problems from differential equations will be given.
12. "Characteristic Classes of Foliations" Ira Koskowitz
This talk will be an introduction to foliations and certain algebraic means of determining their structure. A foliation is a way of slicing up a manifold, and characteristic classes are certain cohomology classes of the manifold. Special emphasis will be placed on Bott's Vanishing theorem and related results.

13. "Which Card to Lead" Craig Bailey
A mathematical discussion of the proper choice of leads in bridge.
14. "Envelopes Via the PC" William Sanders
Designs can be the source of serious inquiry leading one to seek explanations in formal mathematical study rather than just in intuitive visual representation. In this paper the equations of 3 envelopes of 3 sets of straight lines which are generated in the plane containing a proper, positively oriented triangle is sought. Two solutions, one involving "number crunching" after a conjecture and one applying classical methods including projective geometry, will be presented.
15. "Positive Integer Solutions of the Descartes Circle Equations" William J. Berger
A fortuitous conjunction of several facts from geometry and number theory permits construction of algebraic identities explicitly describing all possible primitive solutions in positive integers for certain diophantine equations.
16. "Mathematics Curriculum of the First Two Years: A Report from the Sloan-Funded Schools and Others" Martha Siegel
Dr. Siegel has chaired the MAA panel on discrete mathematics. She will review the results of the six Sloan-funded schools' attempts to develop and teach discrete mathematics. In addition she will discuss other models that have been passed on to her by their champions and the Towson State plan.
17. "The Experience and the Product of a COMAP Winner - Modeling in Animal Populations"
Mike Caulfield, John Kent, Dan McCaffrey, John August
This team from Mount Saint Marys' College was one of the six schools in the country that received the highest rating last year in the applied mathematics exam. The experience of preparing for and taking the exam will be discussed as well as the winning paper itself.
18. "Loops in 4-Regular Plane Graphs" Bruce Richter
This talk is devoted to the question, "How many minimally closed paths can occur by going "straight ahead" in a 4-regular plane graph?" This is in response to the article by F.J.C. de Carvalho, characterizing minimally looped curves. AMM 92 (1985) p 202-207
19. "The Maximum Power Transfer Theorem Without Calculus" Robert Maynard
Relative extrema for certain rational functions can be determined using methods from elementary algebra. One of these functions is the basis for the maximum power transfer theorem. Completing the square methods are applied to determine the relative maxima of this function.
20. "Modeling Io's Volcano" Bernice Kastner
Images of volcanic activity on the Jovian moon Io, obtained by the Voyager probes, have been analyzed using mathematical models. This presentation of the modeling process can be understood by an audience knowing beginning calculus.
21. "Representation of Certain Integers in Terms of Sums of Lucas Numbers" Herta Frietag
According to Zeckendorf's theorem every positive integer can be represented as a sum of distinct Lucas numbers and by excluding consecutive ones the representation is unique provided $L(0)$ and $L(2)$ are not used in the same representation. This investigation singles out certain classes and develops relationships predicting the number of Lucas numbers necessary for this representation.
22. "Programmable Programming Discrete Mathematics" Robert Krzywiec
Written in a structured, algorithmic, automatic statement which can be drawn in one multi...multi-graph similar to the simple mathematical machine being a theoretic model of any computer.
23. "Open Forum: Should Our Section Become Involved in Issues Relating to Elementary and High School Math Education?"
Robert Lewand, Moderator Come and Express your opinion. See more on this elsewhere in the newsletter.
24. "Some Applications of Pure Mathematics at the Census Bureau" Mary Muir-Liggan
The Bureau of the Census collects demographic and economic data by conducting censuses and sample surveys throughout the country. Several applications of math which have been developed here over the years will be described. The focus will be on applications of Galois Theory in variance estimation, topology in automated cartography, and linear programming in survey design.

Montgomery County Maryland



Rockville Campus

Preregistration Form

Registration for the Fall Meeting |_| @ \$2.00 each \$ _____
Dinner reservations |_| @ \$14.00 each _____
Workshop |_| @ 10.00 each _____

Person or persons to be credited by the Treasurer

_____ Name
_____ Address
_____ State _____ Zipcode _____

Send your reservations to: Dr. Ray Hancock
 Box Y
 Emory and Henry College
 Emory, VA 24327

Maryland-District of Columbia-Virginia
Section of MAA
University of the District of Columbia
Washington, DC 20008

Non Profit Organization U. S. Postage Paid Washington, DC PERMIT NO. 9448
--