Quaternion

Department of Mathematics Newsletter

Vol. 2, Number 1 Fall, 1985

CHAIRMAN'S COMMENTS

In a recent article entitled "Renewing Undergraduate Mathematics", L.A. Steen, President of the Mathematical Association of America, states, "Undergraduate mathematics bears major responsibility for the future well-being of American society." (See Notices of AMS, August 1985.) Could such a strong statement be accurate or has he overstated the facts?

If accurate, the validity of the statement rests upon the premise that mathematics permeates virtually every discipline taught in an undergraduate curriculum. No longer are the concepts of mathematics used only in physics and engineering but they are also found in disciplines as diverse as medicine, music, agriculture, government and linguistics. Consequently, as Professor Steen goes on to point out, "collegiate mathematics must provide courses for future scientists, programs for prospective elementary and secondary school teachers, remedial courses for those entering college unprepared in mathematics, general education courses for students not majoring in a quantitative discipline, strong majors for those intending to enter graduate school, and a variety of service courses ranging from elementary statistics to advanced operations research."

Even if Professor Steen's assertion is only partially correct, enormous challenges face the mathematical community. In view of the increasing importance of mathematics in our society, the age-old triad of teaching, research, and service in academe takes on new dimensions for undergraduate mathematics education. Teaching must not only bring knowledge to students but convey to them the excitement of how to use this knowledge creatively in solving problems of modern science, technology, and society. Research must include scholarship and professional activity which will augment good teaching by imbuing course content with relevant and current mathematics. Service must include maintaining a mathematics curriculum that meets students' needs with traditional as well as experimental courses and that links the many facets of the undergraduate curriculum.

The Department of Mathematics constantly seeks to meet the challenge. Specific measures have been taken during the last year to improve undergraduate instruction and service. Due to increased funding, the Department has been able to double a very important resource - its number of graduate teaching assistants. An additional fifty percent are anticipated beginning in the fall of 1987. Consequently, average class sizes for lower level mathematics courses are being reduced to twenty-two per section.

To enhance mathematical instruction two new computer labs have been added to the Department. One is a computer lab consisting of microcomputers and terminals connected to the University's IBM 3081D mainframe computer. The lab serves students enrolled in mathematics computer-related courses such as numerical analysis, applied statistics, computer graphics, and LISP in which computer access is important. The Department has also been able to purchase terminals to establish a PLATO lab. This lab is used in conjunction with the College Algebra and Trigonometry course and enables students to receive tutorial assistance via a sophisticated computer educational package. The lab augments in-class instruction and enables the student to work at his/her pace in developing algebraic skills.

The Department is pleased to have available the services of several visiting scholars during the academic year. These scholars, listed elsewhere in the newsletter, consult with faculty, bring their expertise to the Department, offer special seminars and colloquia, and teach undergraduate courses. They bring fresh ideas and insights to faculty and students alike and are a welcome addition to the Department.

The Department is presently investigating the feasibility of a biomathematics program. This program would interact with the disciplines of biology, medicine, and public health. Such a program would help fill a growing need for the application of mathematics to biological sciences.

Further newsletters will give additional information of the progress of these and other efforts of the Department to meet the challenges which it faces as part of the mathematical community.

WELCOME ICM

The Department of Mathematics is pleased to announce the creation of a new Institute for Constructive Mathematics (ICM). Supported by a President's Council Award, ICM will provide a network of communication among researchers and students in the state of Florida who work in the constructive aspects of mathematics such as approximation theory, numerical analysis, mathematics algorithms, computer graphics, and pattern recognition. It is hoped that ICM will bring added recognition to the research activities in the Math Department by focusing on areas that overlap with our international journal, *Constructive Approximation,* as well as areas in which the department has had successful grant funding.

One emphasis of ICM will be to host and help support visitors from foreign countries. This academic year mathematicians from China, England, Germany, Israel, Sweden, and Switzerland will spend from one to several weeks in our department conducting research activities and presenting lectures.

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The first Director of the ICM is Prof. Edward Saff and the Associate Director is Prof. Joseph Liang. The Institute welcomes suggestions and input from faculty as well as students.

MATHEMATICS HONOR PROGRAM

The Department has received final approval for an Honors Program. Mathematics majors may be admitted to the program when they (a) have completed MAS 3103 (Linear Algebra), MHF 3102 (Set Theory) and one of the calculus sequences MAC 3281-3283 or MAC 3211-3413, and (b) have at least a 3.5 average in their college mathematics courses. Successful completion of the program will be prominently displayed on the students' diploma and will be recorded on the official USF transcript of the students' work. Details of the requirements for the degree of Mathematics with Honors are available in the Mathematics Office.

M.A. REQUIREMENT CHANGES

There have been several recent changes in the Department requirements for the M.A. degree in mathematics.

The qualifying examination requirement for the M.A. degree in mathematics has been changed. The requirement now states that each M.A. student pursuing a non-thesis option must pass at the Master's level one qualifying examination to be chosen from the following areas: Algebra (MAS 5146, MAS 5311, MAS 5312); Real Analysis (MAA 5306, MAA 5307); Topology (MTG 5316, MTG 5317); Mathematical Statistics (STA 5446, STA 5326). The satisfactory defense of a Master's thesis will also be accepted for the qualifying examination requirement.

The Mathematics Department has been granted a permanent waiver of the University rule requiring 16 hours of 6000 level courses for the M.A. degree. This waiver goes into effect immediately.

ALUMNI CORNER

The first Ph.D. in mathematics was awarded at USF in 1975. Since that time thirty-three students have received the degree. The first recipient had to not only satisfy the general requirements for the degree but also establish a standard for further students to follow.

Who was the first recipient? Has he/she proved to be a worthy recipient of which USF can be proud?

He is Professor James R. Ward, currently Professor of Mathematics at the University of Alabama at Tuscaloosa, and he has indeed proved to be a worthy recipient of the first Ph.D. degree in mathematics from USF.

Professor Ward received his Ph.D. degree under the tutelage of Professor Athanassios Kartsatos with a dissertation entitled "Existence and Stability for Nonlinear Volterra Integral Equations." His area of interest is nonlinear analysis and differential equations. Since graduating from USF he has spent a year (1974-1975) at Wright State University (Ohio), a year (1975-1976) at the University of Oklahoma, and three years at Pan American University (Texas). In 1979 he went to the University of Alabama.

Professor Ward has authored or co-authored twenty-five research papers in leading mathematical journals. Some of these are with Professor Jean Mawhin, a world authority in the field of degree theory and partial differential equations. Additionally he has lectured and participated in conferences throughout the world. Examples include lectures at the University of Louvain in Belgium (1983), at the International Research Institute (S.I.S.S.A.) in Trieste, Italy (1984), and at conferences in Oberwolfach (Germany) and Santiago (Chile), and a recent series of talks at Memphis State University.

Mathematicians may expect to hear more of James Ward. He is still a young and increasingly productive mathematician. We're happy he is one of USF's graduates.

CENTER FOR MATHEMATICAL SERVICES ACTIVITIES

During the past summer over one hundred and fifty secondary school students from Hillsborough and Pinellas counties participated in the Center's summer programs for gifted students. These students received instruction in biomedical and life science, computer programming, number theory, linear algebra, physics, chemistry, and engineering science. The high school students who requested it were given college credit for the work that they completed. Some of the students were able to work on individual projects under the supervision of faculty from the Department of Mathematics, Biology and Chemistry, and from the College of Engineering. The outstanding seniors in the programs were awarded USF Freshmen Scholarships for 1986-1987.

Training Programs in Applied Mathematics are currently offered by the Center for Mathematical Services. In these programs USF students are hired by the Center to work on contracts with local businesses and industries. A student typically works at the company for 15 hours per week on a special project of importance to the company. This provides the student with first-hand experience in applied mathematics that is invaluable in obtaining a position in industry. Over half of the trainees receive job offers upon graduation. This past year the Center had trainees working at GTE Data Services and Honeywell Aerospace.

The Center for Mathematical Services conducts a mentor program for the Center for Excellence in Mathematics, Science, Computers, and Technology. In this program high school students work with faculty members or advanced students on mathematical projects. In the past students have studied topics in probability, special trigonometric functions, advanced calculus, linear algebra, and computer science. This program provides an excellent opportunity for high school students to receive guidance in doing science fair projects in an area of mathematics.

The Center for Mathematical Services also conducts a lecture series on Mathematics in Today's World. This series is sponsored by the Center for Excellence in Mathematics, Science, Computers, and Technology and the greater Tampa Chamber of Commerce. USF faculty members from Mathematics, Engineering, and Chemistry are teamed with representatives from business and industry to talk with groups of secondary school students on topics in mathematics and on application to problems in business and industry. Last year over 1500 students attended these lectures which were given at schools in Hillsborough and neighboring counties.

Anyone interested in additional information about the Center for Mathematical Services or its programs may contact Dr. Kent Nagle, Director, Center for Mathematical Services, University of South Florida, Tampa, Florida 33620.

PI MU EPSILON

The Florida Epsilon chapter of Pi Mu Epsilon recently inducted 6 members over the summer. They were: Kelli Carroll, Kenneth Fisher, David LaRussa, Britton Powers, Catherine Underwood,

and Peter Varisco. This fall, the club invited 4 more individuals: Laura Cowgill, Gregory Pope, Catherine Szelistowski, and Janice West.

This year the Chapter celebrates its 20th birthday, having been installed as a part of the National Pi Mu Epsilon Fraternity on April 13, 1966. At the same time, we will induct our 500th member, Catherine Szelistowski. The club has begun another active year. On September 18, Sam Tannous gave his Presidential address on a mathematical approach to an old puzzle, "The Queens Problem."

On October 9, Professor D.S. Lubinsky, who is visiting the University this year from the Council for Scientific and Industrial Research, spoke on: "Continued Fractions and Pade Approximants." Because of the interest showed by our members in careers in or using mathematics, Dr. Kent Nagle, Director of the Center for Mathematical Services at USF, spoke on careers in mathematics and mathematics in careers in a talk titled, "What's It Worth to You" on October 23. Pi Mu Epsilon sponsors these talks as a service to the University community. Members and non-members alike are cordially invited to attend.

STUDENT NEWS AND ACTIVITIES

Our Spring and Summer 1985 Mathematics graduates are:

Spring 1985

B.A.'s
Santo Branciforte
Eric M. Buel
Kelli A. Carroll
Lisa Casner
March Finlen
Michael Fittin
Jonathan Frisco
Lance Hankinson
John W. Mills, Jr.
Catherine Underwood

Summer 1985

B.A.'s
Jeanette Brooks
Peter S. DiCroce
Ricardo Lopez
Rockford Rathgeber

M.A.'s
William Albrecht
Gregory Budzban
Janice Kartsatos
David Kerr

Ph.D.
Stephen Gibert (Dissertation Title: Non-homogeneous Products of Infinite Non-negative Matrices and Non-homogeneous Markov Chains. Dissertation Advisor: Prof. A. Mukherjea.)

A special welcome is extended to our new full-time graduate students. These students, and the schools from which they received their previous degrees are: Mansour Al-Kadi, King Saud University (Riyadh, Saudi Arabia); Laurice Anderson, North Park College (Chicago, IL); Peter Arvanites, Manhattan College (Riverdale, NY); Ronald Brusa, Augustana College (Rock Island, IL); Lisa Casner, USF; Xisheng He, Shanxi Normal University (Shanxi, China); Ching Hsu, Institute of Applied Mathematics Acadenia Sinica (Beijing, China); Wang-der Lee, New Mexico Highlands University (Las Vegas, NM); Margaret Matinek, Eastern Kentucky University (Richmond, KY); Scott Meeker, Florida Southern College (Lakeland, FL); Robert Plance, University of South Carolina (Coastal Carolina); Trina Reyes, Manhattanville College (Purchase, NY); Denise Schrimsher, Marshall University (Huntington, WV); Jaedong Shim, Wright State University (Dayton, OH); Nalina Suresh, Madurai Kamaraj University (Madurai, India); Catherine Underwood, USF; Jeanner Valentin, Northern Illinois University (Dekalb, IL).

FACULTY NEWS AND NOTES

Faculty from the department were engaged in a variety of activities during the summer.

Professor AHMAD was a visiting professor in the Mathematics Department at the University of Otago, New Zealand, and in the Statistics Department at King Saud University, Saudia Arabia. In August, he was an invited speaker at the bi-annual meeting of the International Statistical Institute in Amsterdam where he presented a paper on "Berry-Esseen Bounds for Sample Quantities." Also in August he was an invited speaker and session chairman at the Second International Conference on Probability and Information Theory where he presented a paper on "Limit Theorems and Their Rates of Convergence in Renewal Theory." Professor Ahmad has also been elected a member of the International Statistical Institute.

Professor CERRITO received an NSF Travel Grant to attend the Sixteenth Conference on Stochastic Processes in Nagoya, Japan in July, and she received a Sponsored Research Travel Grant to attend the International Statistical Institute Satellite Meeting in Maastricht, the Netherlands in August. At these meetings, Professor Cerrito presented a paper entitled "An Approximation of Partial Sums of Independent Random Variables and Applications to the Brownian Bridge."

Professor GOODMAN and wife traveled extensively during the summer. In addition to visiting Israel, Professor Goodman traveled to Italy (too hot), Holland, Belgium, England (each too cold), and Switzerland (just right). Professor Goodman reports that in casinos in Belgium and Holland "my routine test of the laws of probability showed they hold up in Europe as well as everywhere else." In Tel Aviv Professor Goodman gave a talk on "Convex Functions of Bounded Type," and upon returning to the U.S., completed a joint paper with I.J. Schoenberg on a new proof of the classical theorem of Grace on polynomials.

Professor KARTSATOS gave a colloquium lecture at the University of Central Florida in September, and presented a paper at Georgia Tech at the Southeastern Atlantic Conference on Differential Equations in October. He has also been invited to spend a month next spring at the International Research Institute in Trieste. The expenses will be covered by the Italian Government.

Professor LEE organized and conducted a seminar called "Control Theory Seminar." He has also worked with Professor RAO and visiting professor K. LEE on control problems.

Professor MUKHERJEA presented invited talks at the Mathematics Department colloquiums of Dalhousie University in Halifax, Canada and Howard University in Washington, D.C. Professor Mukherjea also visited and lectured at the Center of Mathematical Statistics at Bucharest, Romania and also at the Universities of Timisoara and Brasov in Romania. His lecture tour was sponsored by the U.S. National Academy and the Romanian Academy of Sciences.

The Department of Mathematics is pleased to have a number of visiting scholars in the Department during Semester I or II. Among these are:

Professor Doron Lubinsky of the Council for Scientific and Industrial Research

Professor Judy Palagallo of the University of Akron

Professor Thomas Price of the University of Akron

Professor Lothar Reichel of the University of Kentucky

Professor Herbert Stahl of Technische Universität, Berlin

Professor Jorg Waldvogel of ETH, Zurich

CALENDAR

The Colloquium speakers for Semester I were as follows:

September 20
Prof. P.K. Sen, University of North Carolina: "Time sequential non-parametrics: Theory and Application to clinical trials and life testing models"

October 4
Prof. G. Contopoulis, University of Athens: "Ordered and Stochastic motion in Dynamical Systems"

October 16
Prof. M.Z. Nashed, University of Delaware: "Variational derivatives and differential calculus in function Spaces"

October 30
Prof. B. Harris, University of Wisconsin-Madison: "Some limit-theorems in Analytical Random Allocation Problems"

November 6
Prof. M. Ghosh, University of Florida: "Sequential Shrinkage Estimation"

November 15
Prof. C. Morales, University of Alabama-Birmingham: "Solvability of a nonlinear problem in a Banach Space"

November 20
Prof. L. Debnath, University of Central Florida: "Some nonlinear problems in Applied Mathematics"

December 4
Prof. E. Levin, Everyman's University, Tel Aviv: "Some Phenomena in Complex Rational Approximation"

Future speakers in the Department include:
Prof. A. Nakassis, National Bureau of Standards
Prof. W. Hausmann, University of Duisburg
Prof. S. Chae, USF New College
Prof. F.V. Atkinson, University of Toronto
Prof. J. Mawhin, University Catholique de Louvain

Information regarding future speakers can be secured from the Department office at 974-2643.

The Florida Section of the MAA will be held at Seminole Community College on February 28 and March 1, 1986.

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