



Quaternion

Department of Mathematics Newsletter

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CHAIRMAN'S COMMENTS

The Department of Mathematics at the University of South Florida is located within the College of Natural Sciences together with the departments of Biology, Chemistry, Geology, Marine Science and Physics. Because of the foundational relevance of mathematics to these disciplines this is an appropriate home for the Department.

Mathematics has characteristics, however, which distinguish it from these other disciplines. One of these is its language. In an essay by E. Kasner and J.R. Newman entitled "New Names for Old," these authors offer the following booby-prize definition of mathematics: Mathematics is the science which uses easy words for hard ideas. In contrast, they go on to point out that in biological science, for example, of the thousands of known species of insects every one has a long Latin name. (You probably have an orthopteron in your house right now.) "In chemistry," they state "words no more complicated than sugar, starch, or alcohol have names like these: Methylpropenylenedihydroxycinnamylacrylic acid, or, O-anhydrosulfaminobenzoine, or protocatechuicaldehydemethylene."

Mathematics, it may be argued, also uses hard words. A scan at the index of a mathematics text turns up words like homeomorphism, orthocomplement, homotopic, equiconnected, and sesquilinear to support this point of view. These kinds of words, however, are in the minority in the mathematician's vocabulary. One is more likely to encounter words like open, closed, complete, dense, group, filter, real, complex, generator, and function. All of these sound like relatively simple terms. The fact that many simple sounding mathematical words like ring, function, group, measure, graph, control, and category all have an associated theory suggest that these words do define hard ideas.

An admitted drawback of using easy words for mathematical ideas is the ambiguities that can arise. For example, think of what the terms radical, functions, groups, and rings may mean to the mathematically uninformed. For those who may think these are social terms, the respective prefixes ultra, injective, simple, and commutative must add further difficulties.

On the other hand, mathematicians know that their language is very rich and well selected. What word - easy as it is - would better describe the concept of being compact than "compact" or of being complete than "complete"? It is hard to think of more appropriate terms to denote their meanings in mathematics than continuous, perfect (number), measure, abundant (number), residue, or simple (function or curve).

Mathematics also has many aesthetic terms appropriate to the view that it is art as well as science. Words that come to mind are words like atom, locally compact, locally connected, totally ordered, uniformly continuous, smooth, extremely disconnected, separable, and discrete - each of which describe beautifully the object or mathematical structure they modify.

It seems to be true that mathematics, in contrast to other scientific disciplines, uses easy words to describe hard ideas. But I also think the language is most appropriately chosen - being descriptive, rich, and aesthetic. Think about it.

SOUTHEAST APPROXIMATOR'S CONFERENCE

The Southeast Approximator's First Annual Conference was organized by the Institute for Constructive Mathematics of the Department of Mathematics. It was held April 17, 18 and 19 in the Mathematics-Physics Building of the University.

An important purpose of the conference was to help coordinate the research efforts in approximation theory in the southeast. Talks presented included the topics of orthogonal polynomials, fractions, rational approximations, and spline approximations.

The conference began with a welcome by Dean Leon Mandell of the College of Natural Science and Chairman Kenneth Pothoven of Mathematics on Thursday. A conference banquet was held on Friday evening at the Tower Club in downtown Tampa. After the morning talks on Saturday, conference participants and their families were guests of Busch Gardens.

CENTER FOR MATHEMATICAL SERVICES ACTIVITIES

This summer the Center will be offering five summer programs for gifted secondary school students. Two of these programs will take place on the St. Petersburg campus and three on the Tampa campus. The five programs are: USF - Pinellas County Mathematics and Science Program
USF - Pinellas County Frontiers of Modern Science Program
USF - Hillsborough County Mathematics and Science Program for Junior High Students
USF - Hillsborough County Mathematics and Engineering Program
USF - Hillsborough County Biomedical and Life Science Program

Instruction in these programs is provided by faculty from the Colleges of Natural Sciences and Engineering. A high school student can receive 3 credit hours for the work completed. The outstanding seniors in these programs will be awarded USF - Freshman Scholarships for 1987-1988.

Training programs in applied mathematics are currently offered by the Center for Mathematical Services. In

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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. If your company is interested in this program, please contact Dr. Nagle.

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 applications to problems in business and industry. This year we will give over 100 lectures to over 3000 students.

The Center for Mathematical Services conducts a science mentor program for the Center for Excellence in Mathematics, Science, Computers, and Technology. In this program high school students receive guidance in doing science fair projects in any area of science, engineering or mathematics.

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.

FACULTY NEWS AND NOTES

Faculty from the department were engaged in a variety of activities since the last issue.

Professor AHMAD recently had several papers accepted for publication and is in demand as a speaker. Professor Ahmad was an invited speaker at the NSF regional conference on the Stochastic Diversity of Species at Oklahoma State University in March and gave a talk at the University of Florida in April. He is scheduled to speak at the Second International Con-

ference on Probability and Information Theory at McMaster University in August.

Professor CLEAVER received the annual award for Outstanding Service in Mathematics presented by the Florida Section of the Mathematics Association of America at the annual Florida Section meeting in Sanford.

Professor GOODMAN reports the publication of three papers. "Triangles in a Complete Chromatic Graph with Three Colors" was published in *Discrete Mathematics*; "An Entire Function that Gives the Fibonacci Numbers at the Integers" was published in *Fibonacci Quarterly*; and "Convex Curves of Bounded Type" was published in the *Journal of Mathematics and Mathematical Sciences*. Professor Goodman also reports that two other papers have been accepted and two others have been submitted.

Professor KARTSATOS gave a talk at the International Conference of Differential Equations and Mathematics held in Birmingham, Alabama. He also announced some results of his joint work with Professor B. Calvert of the University of Auckland, New Zealand. Professor Kartsatos has been invited to speak on his current research at the third Spring School on Nonlinear Analysis in Prague during May.

Professor LEE organized a special session entitled "Operator Methods of Optimal Control Problems" at the annual meeting of the American Mathematical Society in New Orleans. Thirteen speakers were invited to the session. Proceedings of the session will be published by the AMS or Marcel Dekker, Inc. Professor Lee also presented a talk on "A Class of Singular Control Problems" at the IFIP-TC7 Conference on Control Problems Described by Partial Differential Equations and Applications held at the University of Florida in February. Professor Lee has also been working with Professor Rao on a stochastic control problem.

Professor SAFF helped conduct a short course in approximation theory at the annual meeting of the American Mathematical Society. Lecture notes including "Approximation and Interpolation by Rational Functions" by Professor Saff will be published by the AMS. Professor Saff is Editor-in-Chief of the journal "Constructive Approximation" and was pleased that the AMS selected approximation theory as its

featured topic for the annual meeting. Professor Saff has also received a grant from NSF for continued research in approximation theory, and has also received a grant for cooperative research with mathematicians in the United Kingdom.

Professor C. WILLIAMS became president of the Division of Dynamical Astronomy of the American Astronomical Society in April. She had been the vice-president of this organization. Professor Williams spent last summer at the National Bureau of Standards in research on the use of Hamiltonian Schemes in the solution of the Stark and Zeeman effects. She also conducted research on artificial satellite theory and long term planet orbits while there.

ALUMNI CORNER

The Outstanding Scholar at USF in 1975, as presented by the Pi Mu Epsilon Honor Fraternity, was senior student Robert Tubbs, who graduated in 1975 with a major in mathematics. Today Dr. Robert Tubbs is an Assistant Professor of Mathematics at the University of Texas at Austin.

After leaving USF, Dr. Tubbs went to Columbia University in New York for one and one-half years and then to Penn State University where in 1981 he received his Ph.D. degree in Algebraic Geometry and Transcendental Number Theory under Professor Dale Brownawell. From there he went to Clairmont College from 1981-84 as an Assistant Professor and then to the University of Texas in 1984.

Already in his young career, Dr. Tubbs has distinguished himself as a mathematician both nationally and internationally. He is a recipient of an NSF grant in number theory and he has spoken at many national and international conferences. During this academic year he is visiting the Institute for Advanced Study in Princeton. During the summer of 1986 he will study in Paris at the Institute of Poincare.

We are happy Robert Tubbs is one of USF's alumni and wish him well at the start of a promising and productive career.

SUMMER COURSE OFFERINGS OF INTEREST TO TEACHERS

The Mathematics Department will offer the following courses during the summer session:

Session B - June 26-August 13
 MAA 4211 Advanced Calc. I MTWF
 10-11:50 a.m.
 MAD 3100 Applications Oriented
 Algebra MWF 12-1:50 p.m.
 MAD 5305 Graph Theory MWF
 10-11:50 a.m.
 MAS 5215 Number Theory MWF
 2-3:50 p.m.
 MAT 5932 Statistics for Teachers MW
 6-8:50 p.m.

M.A. PROGRAM CHANGES

The faculty recently approved a change in the foreign language requirement and a change in the requirements for the M.A. degree.

Graduate students are now allowed to exercise any of the three options that the Graduate School has declared acceptable for meeting the language requirement in French, German, or Russian. These three options include taking appropriate courses from the Foreign Language Department and earning a grade of B or above, achieving a score of 450 or above on the Graduate School Foreign Language Test, or passing a proficiency exam in which relevant material is translated into English. (Previously only the latter option could be exercised by mathematics students.)

In addition to the requirements for an M.A. degree which are given in the university catalog and department handbook, the student must complete at least two two-course sequences from the ten sequences listed as subjects for the qualifying examinations. A "B" average in each of two sequences must be obtained. Other sequences may be substituted upon approval of the graduate committee.

FACULTY PROFILE

ATHANASSIOS G. KARTSATOS

Athanassios Kartsatos was born in a small village in the mountainous country of the Peloponnesian Peninsula near Corinth in Greece. When he was five years old, his family moved to Athens where he received his schooling. In 1960, he entered the School of Mathematics at the University of Athens, where he concentrated on the study of differential equations. In 1966, he received a Fulbright Fellowship to study at Wayne State University in Detroit. Unaccountably, the university had no one with whom he could work in differential equations, so he switched to topological semigroups. In 1967, his advisor died. Rather than selecting

another advisor to work in an area in which he had little interest, the determined scholar wrote a thesis, with no major professor, in differential equations titled: "Oscillations and Asymptotic Behavior of n th Order Differential Equations." He returned to the University of Athens in 1969 to serve a required two year term in the Greek Army and to work with Professor Kappos, who had been a student and colleague of Caratheodory in Erlangen. While in the Greek Army, he was awarded the Ph.D. by the University of Athens in 1969. In 1971, he left the army and Greece to return to America, to USF, which has been his first and only position. The young professor found the new Ph.D. program ideally suited to his talents. Graduate students found him easy to work with, sympathetic and helpful. His determination and enthusiasm have made him a most popular director among the doctoral students. In March, 1975, James Ward became the first of his students, indeed, the first student in the USF mathematics doctoral program, to receive a Ph.D. Dr. Ward, whose dissertation was on the implicit function theorem in Banach spaces and integral equations, now holds the rank of Professor at the University of Alabama. Other students followed quickly. William Zigler, August, 1975, who wrote on weak solutions of differential equations in reflexive Banach spaces. Dr. Zigler was employed by the BDM Corporation in California when he passed away. Terry Walters, 1978, who wrote on oscillations of scalar and matrix differential equations, is an Associate Professor at the University of Tennessee at Chattanooga. Jorge Toro-Gonzalez, 1979, is a high administrative official at the Polytechnic Institute in Mexico City. His dissertation was on passivity for differential equations in Banach spaces. Witold Kosmala, 1980, wrote on oscillations of n th order equations. He is now an Associate Professor at Appalachian State University in North Carolina. In August, 1984, two of Dr. Kartsatos' students received their doctorates. Victor Dannon is now an Assistant Professor at Ohio University in Athens. His dissertation was on evolution operators in Banach lattices. Jessica Craig, who wrote on functional evolutions in Banach lattices, now teaches at Eckerd College in St. Petersburg. In December, 1985, Dr. Kartsatos' most recent doctoral student, Richard D. Mabry, graduated. Rick wrote his dissertation on the control of space with preassigned responses. He is currently working with Morrisound in Tampa. Several other students are working with Dr. Kartsatos, so we may

expect this list to be augmented soon.

As the author of over 80 research papers in differential equations and nonlinear analysis, Professor Kartsatos has achieved an international reputation. He has been invited to give talks and colloquia in Tokyo, Hiroshima, Mexico City, Paris, Oberwolfach in Germany, Montreal, and, of course, Athens, as well as at numerous meetings and symposia in the United States. He is now spending a month at the Institute of Advanced Studies in Trieste, Italy. While he is there, he will travel to Prague to speak at the Third Spring School in Nonlinear Analysis. He is currently working in nonlinear analysis and differential equations in Banach spaces. He is collaborating on research with Professor Bruce D. Calvert of Auckland University in New Zealand.

Professor Kartsatos is married to the former Janice Zablocki, who is a doctoral student in the Department of Mathematics.

PI MU EPSILON

The Florida Epsilon Chapter of Pi Mu Epsilon fraternity has elected 7 students to membership in the Spring Semester. These are: Krista Embry, William H. Hughes, Margaret Martinek, Richard A. Moscatello, Andrea Osman, Ki-Yeon Shin and Michael Robert Willis. These and the 10 students elected in the Summer and Fall Semesters were inducted into the Fraternity at a banquet held on April 25. Dr. Sara Mandell, the featured speaker at the banquet, discussed aspects of pure mathematics found in the writings of Ancient Babylon. Dr. Mandell is a classicist with interest in the history of science.

Each year, the Chapter selects a senior or recent graduate from among its members to recognize as Outstanding Scholar. This student's overall academic work is considered, but especially the work done in the last two years in mathematics. The student so honored this year is PETER CHENG, who graduated with a double major in Mathematics and Computer Science last December, and is now a graduate student in the Department of Computer Science. Peter will be presented with a plaque recognizing this award at the Induction Banquet. His name will be inscribed on the permanent plaque which is displayed on the first floor of the Mathematics-Physics Building.

As a culmination of many years of effort by many people, a monument recognizing the contributions which the honoraries make to the academic life of the University was dedicated on April 9, during Honors Week. This monument stands near the entrance to the Library and features plaques from most of the campus honoraries, including Pi Mu Epsilon.

We congratulate the University of Tampa Mathematics Club, which became the Florida Iota Chapter of Pi Mu Epsilon at an Installation Ceremony and Banquet held on April 16. Dr. Fredric Zerla, Faculty Correspondent of the U.S.F. Chapter of Pi Mu Epsilon and a former national councillor of Pi Mu Epsilon Fraternity represented the National Fraternity. The students and faculty at the University of Tampa who worked hard for this honor deserve recognition, particularly Dr. Marcelle Bessman, the Faculty Correspondent and driving force behind the new chapter. We offer our best wishes to the Florida Iota Chapter for their continued success. We look forward to working with them in the future.

Our own chapter continued an active year of scholarship. On November 8, Professor Arthur David Snider of the Electrical Engineering Department discussed "Mathematical Topics in Mechanical Engineering." On November 20, Professor Carol Williams presented a most timely talk on "An Astronomer's View of Halley's Comet." To close the Semester, Professor Jon Snader, on December 4, told of "The Integral of the Secant." Our Student Correspondent, Peter Cheng, opened the new Semester with a talk on January 20 on "How to Solve a Regression Matrix Using Numerical Methods."

This talk contained some of Peter's own contributions to the problem. On February 3, Dr. Lothar Reichel, who is visiting from the University of Kentucky for the year, addressed the Chapter on "Numerical Solutions for Electromagnetic Field Problems." On February 17, another of the Department's welcome guests, Dr. Thomas Price of the University of Akron, told of his work with various hospitals in the Akron area in his talk on "Biostereometrics and Breast Cancer Detections." Our meeting on March 3 featured Dr. Joseph Liang, who spoke on "Hilbert's Tenth Problem to Finite Simple Groups: Some Famous Solved Math Problems." On March 31, another of our visitors, Professor Jorg Waldvogel of the Swiss Federal Institute of Technology (ETH), Zurich, spoke on "The Distribution of Primes." These talks are presented as a major part of Pi Mu Epsilon's function on campus. Interested people are cordially invited to attend and to take part in Pi Mu Epsilon activities.

MAA NEWS

The Mathematics Department participated in the annual meeting of the Florida Section of the Mathematical Association of America which was held at Seminole Community College in Sanford. Dr. You-Feng Lin presented a paper on "A Theorem of Wallace" at the session in memory of A.D. Wallace. Dr. William Hudgins of the adjunct faculty of the Department of Mathematics contributed a paper on "Patterns of Irrationality." Dr. Fredric Zerla organized the Pi Mu Epsilon Undergraduate Paper Session. Our former students were well represented at the meeting. Dr. Emilio Toro of the

University of Tampa contributed a paper on "Fermat's Last Theorem - The First Case." Marilyn Bickel of E-Systems, ECI Division, contributed a paper on "A Simple 3-D Surface." Liana Fox of Hillsborough Community College presided over the Women and Mathematics Session. At the business meeting closing the session, Dr. Zerla was elected President-Elect of the Florida Section. The mathematics instructors of the State of Florida showed their appreciation for the many years of dedicated work of Professor Frank L. Cleaver by presenting him with the Florida Section's Distinguished Service Award. The State of Florida is fortunate to have people of the caliber of Dr. Cleaver willing to volunteer their talents to the betterment of mathematics education in the State.

Three outstanding mathematicians and educators spoke at the meeting. Professor Howard Eves of the University of Maine spoke on "Two Surprising Theorems on Cavalieri Convergence." Professor Garret Birkhoff of Harvard University spoke on "Order Relations and Arithmetic." Professor Ronald M. Davis, Vice President for Community Colleges of the MAA, told of his teaching techniques in "Turning Students on to Mathematics - A Role of Beginning Undergraduate Mathematics Courses."

The Mathematics Department also participated in the Suncoast Regional Meeting held at the Clearwater Campus of St. Petersburg Junior College on December 6, 1985. Drs. Kenneth Pothoven and Fredric Zerla were on the Arrangements Committee. Dr. Zerla was a member of a panel which explored and suggested modifications to courses in the undergraduate curriculum.

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