Quaternion

USF UNIVERSITY OF SOUTH FLORIDA

Department of Mathematics Newsletter

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The Quaternion is the newsletter of the Department of Mathematics, at the University of South Florida. We are sending out nearly a thousand copies to alumni, local mathematics educators, local movers & shakers, and fellow inhabitants of USF.

We want to get in touch. This is a time of change in mathematics, and we want to find out how to serve the community better. Send us letters with questions, comments, advice, criticism. Feedback will appear in future issues.

For the electronically addicted, the departmental e-mail address is mathdept@math.usf.edu, and our home on the web is: http://www.math.usf.edu/. The more traditionally inclined can reach us at:

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This issue was put together by the Publicity Committee, consisting of Gregory McColm, Kandethody Ramachandran, Boris Shekhtman, and Carol Williams, with help from other members of the Department.

THE NAGLE MEMORIAL LECTURE SERIES

During the 1996-97 academic year, the Department will be inviting six speakers to come and speak about mathematics, and its relation to the community. This series is dedicated to the memory of Professor **KENT NAGLE**, who was very active in bringing mathematics to the community. All talks will be at 7:30 pm, at a place TBA. For more information, contact the Nagle Lecture Committee, chaired by Ed Saff, at the Department.

We have scheduled three speakers for this Fall:

On September 19 (tentative), Harold Stevenson, Professor of Psychology at the University of Michigan, will speak on ``Asia's Young Achievers in Mathematics''. He will be introduced by USF President Betty Castor. The lecture will be in the University Lecture Hall.

On October 17, George Andrews, Professor of Mathematics at Pennsylvania State University, will speak about the work of the great number theorist Srinivasa Ramanujan.

On November 14, Peter Borwein, Professor of Mathematics at Simon Fraser University, will speak about π.

During the Spring semester, we will have three more speakers, including Harvard Professor Persi Diaconis, who will speak about magic and mathematics, and Boston University Professor Robert DeVaney.

DEPARTMENT NEWS

NATASHA JONOSKA received a Research and Creative Scholarship Award for $7,500 this year, for research in "DNA Computation of Complex Problems". She also gave an invited talk at the Symbolic Dynamics Workshop (March 28-29) which was held in conjunction with the Annual Workshop on Dynamical Systems at the university of Maryland, College Park.

GREGORY MCCOLM gave two talks at DIMACS last winter. He spoke at the workshop on Logic and Random Structures at Rutgers University in November, and at the workshop workshop on Logic and Random Structures in January.

ARUN MUKHERJEA visited the Universidad de Los Andes, Merica, Venezuala, on March 11-15, under USF's Latin America Intiative. He also spent part of his "sabbatical" semester ('95 fall) at Abo Akademi University, Finland and Universite Paul Sabatier, Toulouse, France. He presented invited talks at Abo on September 20, 1995, at Toulouse on October 6 and October 20 of 1995, and at Johann Wolfgang Goethe-Universitat, Frankfurt on October 25, 1995. He gave an invited talk also at University of Florida, Gainesville on November 20, 1995.

JOHN PEDERSEN spoke at the Joint Mathematics Meeting in Orlando in January.

KANDETHODY RAMACHANDRAN organized two special sessions of the 1996 IEEE Southeastern Conference (April 11-14 at Tampa): Stochastic Dynamic Systems I & II, on April 11 - 14, where he gave a talk. He also spoke at the AMS-MAA Joint Mathematics meeting, January 10-13, at Orlando, where he and **RICHARD DARLING** organized three special sessions: Stochastic Differential Equations and Applications I, II, and III.

MASAHICO SAITO (with J. Scott Carter of the University of Southern Alabama) received a Research and Creative Scholarship Award (Research Council and Division of Sponsored Research, USF) on "Diagrammatic methods for knotted surfaces in the 4-dimensional space".

Last summer, **BORIS SHEKHTMAN** drove 12,000 miles on the perimeter of the U.S. mixing business and pleasure. He visited the jazz clubs in New Orleans and did joint research at the University of Texas in Austin. He climbed down the Grand Canyon in Arizona and collaborated with mathematicians at the University of California--Riverside. He personally witnessed Hugh Grant getting arrested in Los Angeles. He visited San Francisco, lectured in University of British Columbia in Vancouver, and did joint research at Simon-Fraiser University. Then he hiked through the Yellowstone Park and visited his alma mater, Kent State. After a few more similar stops in New York City, Washington D.C., and the University of South Carolina, he finally came home. Life is good. Especially life in Mathematics. It is like having a personal embassy in every city in the world.

Professor **FREDERIC ZERLA**, Mathematics, gave a talk at the closed session for the participants of the Institute on the Teaching of the History of Mathematics at the Joint National Meeting in Orlando on January 11, 1996.

STUDENT NEWS

Since the last issue, the following degrees have been awarded:

B.A.. in Mathematics
Anthony Alto
Jeffrey Baker
Jennifer Blount
Jeffrey Brzoska
John Crites
Eugene Cramer
Sanjay Kurian
Emma Marquis
Oliver Martin
Shannon Ullman

B.A./M.A. in Mathematics
Rebecca Wooten

M.A. in Mathematics
Daniel Jelsovsky
Marianna Makri

CENTER FOR MATHEMATICAL SERVICES

For the seventeenth consecutive year, the CMS conducted summer programs for gifted students on the Tampa campus. A total of 177 gifted students from Hillsborough and surrounding counties attended these programs for six weeks during the summer of 1995. Support for the programs came from the Florida Department of Education, the Institute of Biomolecular Science, and

discussing deep mathematics, with occasional and brief digressions on politics, sports, movies, entertainment figures, and simple gossip. There have been occasional seizures of trendiness, and sometimes the group meets in more respectable (i.e., more vegetables) places, but nothing ever comes of it. Pizza reigns!

Speaking of fun and games ...

PROBLEM SECTION

In our previous episode,

Professor Stark gave a problem: "You are given six kupons (i.e., 6 coins), five of them are identical in weight, but one has a different weight because it is counterfeit. A scale (not a balance) with a digital readout is available for your use. Find a way to locate the counterfeit coin with only three predetermined weighings."

Here is a solution: Suppose you have coins I, II, III, IV, V, VI, five of common weight w and one of a different weight W. First put coins I, II, III, IV on the scale: you get weight 3w + W or 4w, depending on whether or not the odd coin is among the first four. Next weigh coins III, IV, V, VI, again getting 3w + W or 4w. If the first weighing gave 3w + W but the second gave 4w, then the odd coin is I or II; if vice-versa, then the odd coin is V or VI; if both weights were 3w + W, then the odd coin was III or IV (note that since the odd coin is *somewhere*, you can't have both of the first two weighings giving 4w). Now, weigh I, III, and V: if the weight is 2w + W, then the odd coin is among I, III, or V; if the weight is 3w, then the odd coin is among II, IV, and VI. This third weighing will determine which coin is counterfeit.

Now, for another problem, to be answered in the Fall 1996 issue. A special card deck consists of:

$2^0=1$ card with 1 on one face and 2 on the other,

$2^1=2$ cards with 2 on one face and 3 on the other,

$2^2=4$ cards with 3 on one face and 4 on the other,

$2^3=8$ cards with 4 on one face and 5 on the other,

...

2^{k-1} cards with k on one face and k+1 on the other,

... etc.

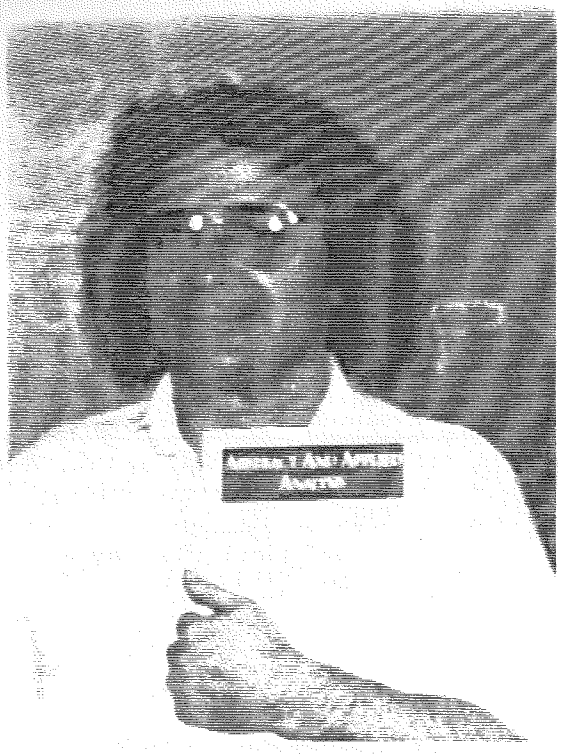
A randomly-selected card is placed so that each face is visible to exactly one of two gamblers. Given only the number seen, they bet $1 on the value of the number seen by their opponent. If there is a unique winner, he/she takes all.

If a player sees, say, 5, then as there are 8 cards of type 4:5, and 16 of type 5:6, the player has a 2/3 chance of being right if (s)he bets that 6 is on the other side. Or does she?

ERRATA/OMISSIONS FROM THE FALL '96 ISSUE

Professor Mark Stewart did not welcome participants of the MAA meeting to Tampa. He was the keynote speaker. The welcoming was done by Associate Provost Jean Linder. We thank her for her support.

The Obituary for Professor Kent Nagle was written by Professor Ken Pothoven.



A NEW JOURNAL

The Department is already the home-base for two journals, the Journal of Constructive Approximation, edited by Ed Saff, and the Journal of Theoretical Probability, edited by Arun Mukherjea. We are now gaining a new journal: Athanassios Kartsatos is a founder and managing editor of the fledgeling journal Abstract and Applied Analysis.

Creating a new mathematical journal is an exciting and rewarding experience. First, you must set an overall goal for the journal: you have to specify what kind of mathematics you would like to publish in it, why, and at what level. Then you set the standards of the journal. These standards affect the constitution of the editorial board, the willingness of invited board members to participate, and the quality of the submitted material.

Professor ATHANASSIOS KARTSATOS and Mancorp Publishing, Inc. have been planning to publish this journal for quite a long time. With the explosive growth of research in nonlinear analysis, they saw the need for a high-quality publication concentrating on some of the main fields, and pulling together some of the main researchers. This research goes much beyond the confines of "mathematics only for mathematicians." Nonlinear Analysis has entered just about every field of science and engineering. A number of physical, biological, mechanical and economic models are now using Nonlinear Analysis. This applied mathematics involves just about every aspect of the theory from Advanced Calculus to Variational Inequalities in Banach Spaces.

Abstract and Applied Analysis is a journal devoted to the publication of high-quality papers in Linear and Nonlinear Functional Analysis, Ordinary and Partial Differential Equations, Optimization Theory and Control Theory.

The editorial board includes some of the "dignitaries" in these fields, including: P. Bnilan (France), F.E. Browder (Member of the National Academy of Sciences, Rutgers), R.E. Bruck (Southern California), E.N. Dancer (Australia), J. Dyson (Oxford), D.G. De Figueiredo (Brazil), J.P. Gossez (Belgium), S.N. Chow (Georgia Institute of Technology), A. Granas (Poland), D. Guo (China), N. Hirano and N. Kenmochi (Japan), W.A. Kirk (Iowa), I. Lasiecka and R. Triggiani (Virginia), J. Mallet-Paret (Brown), V. Mustonen (Finland), J. Necas (Northern Illinois), R. Nussbaum and W.V. Petryshyn (Rutgers), S. Reich (Technion-Israel), M. Schechter (Irvine), I. V. Skrypnik (Member of the Ukrainian Academy of Sciences, Kiev), P.E. Sobolevskii (Israel), N.N. Uraltseva and Olga Ladyzhenskaya (Russia).

FUN & GAMES

On September 20, 1995, the department sponsored a retirement dinner at the Marshall Center to honor Professor Al Goodman. Many faculty and staff members attended. Professor Ed Saff gave a poignant speech, relating many amusing anecdotes. And Professor Goodman himself gave a speech. The party concluded with a toast expressing thanks and good wishes to Dr. Goodman.

On December 2, the department sponsored a picnic at Riverside Park for the graduate students. Many of the students, staff and faculty brought their spouses, kids and even puppy dogs so that we all could meet everyone else's family. There was so much food no one went away hungry, and most of us could not eat for the rest of the weekend. Dr. Kartsatos' champagne was a special treat.

In addition, ...

Allegedly, mathematicians turn coffee into theorems. So where does beer fit in? During the last decade, a highly-variable subset of the faculty have gotten in the habit of meeting Friday afternoons at a nearby pizza joint and

Hillsborough and Pasco Counties as well as from USF. Working with Ken Pothoven were Professors Manoug Manougian (Math), Joseph Liang (Math), and Robert Potter (Chemistry) who directed, respectively, the summer programs in Mathematics and Science, Mathematics and Engineering, and Biomedical and Life Sciences. The summer programs for 1996 are being held now.

The Center for Excellence in Mathematics, Science, Computers, and Technology at USF sponsors the CMS program called "Lectures on Mathematics in Today's World". USF professors and local business people go to regional schools to lecture on relevant topics. The lecture titles include such topics as: `Designing Soccer Balls', `How to avoid execution - The Josephus Problem', `Mathematics and Islamic Art', and `Solving Problems with Paradoxes'.

INSTITUTE FOR CONSTRUCTIVE MATHEMATICS

The ICM has received a $25,000 grant from the National Science Foundation to conduct collaborative research with a French team at INRIA (Institut Nationale de Recherche en Informatique et Automatique). The French team is headed by Laurent Baratchart at Sophia-Antipolis and receives separate funding through the cooperative NSF-INRIA program. The U.S. team consists of E.B. Saff, B. Shekhtman, and V. Totik. The focus of the research is on the application of Approximation Theory to Systems Theory. Dr. Baratchart and his colleagues will be visiting USF in March and a visit to France is planned for June for two members of the U.S. team. Graduate students will also take part in this 3-year cooperative project.

INTERNATIONAL AFFAIRS

In the world of global economy we are bringing foreign scholars to USF. Our students get a taste of a foreign culture and a first-hand experience in dealing with its representatives. The visitors gain better understanding of the United States. Both the visitors and USF faculty profit from joint research and a fruitful exchange of ideas.

GUESS WHAT?

IT IS A WIN-WIN SITUATION.

WHO SAID
"THERE IS NO FREE LUNCH."

1. THE RUSSIANS ARE HERE. This fall the department of mathematics was visited by four mathematicians from former eastern block countries:

Sergei Suetin and Sergei Suslov from Russia.

Vasilii Prokhorov from the Ukraine.

Ralitsa Kovacheva from Bulgaria.

In addition, the Department is hosting two guests, Laurent Baratchart and Franck Wielonsky, who are visiting USF under an NSF sponsored grant with the Institute for Constructive Mathematics. Laurent and Franck are from the Sophia Antipolis (near Nice, France) branch of INRIA (a center for research in mathematics, computer science and control theory sponsored mainly by the French government). They were here until the end of March, doing collaborative research with several of our faculty (who, in turn, will be visiting France in June). And last (but by no means least), Igor Skrypnik, a member of the Ukrainian Academy of Sciences, is visiting us from Donetsk, on a COBASE grant.

We are tapping into the vast unexplored resources of those countries. Already, a number of important scientific discoveries had been made as a result of their visit. Dr. Prokhorov will stay at USF for another semester. We are also are expecting visitors from France and Israel.

EVERYBODY IS WELCOME
TO COME AND CHAT
WITH THEM
ABOUT...WHATEVER.

2. WE ARE EVERYWHERE. In addition to the individual travel, the Department recently made a cooperation agreement between USF and Cyprus. Ed Saff, Boris Shekhtman and Vilmos Totik won a joint U.S.A-France grant for 3 years. With the help of Dr. Suetin we are hoping to enter into a similar agreement with the Steklov Institute in Moscow---the most prestigious Russian think-tank for mathematics.