



# Quaternion

Department of Mathematics Newsletter

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## CHAIRMAN'S COMMENTS

I have been privileged to participate in the General Education Course Design Workshop at the University this Fall. In this workshop, there have been stimulating discussions about a variety of topics ranging from incorporating the dimensions of ethics, race, and ethnicity into general distribution courses to incorporating analytic, conceptual, and creative thinking skills into these courses.

A recent session on assessment conducted by USF's Sandra Schuur was particularly interesting. For this session, participants were asked to read an article entitled "Creative Tests Worth Taking" (from the journal *Educational Leadership*, May 1992) by Grant Wiggins. In this article, Wiggins discusses questions, criteria, and suggestions for creating tests to engage students as well as evaluate their performance.

One crucial point made is that "Typical tests, even demanding ones, tend to overassess student 'knowledge' and underassess student 'know-how with knowledge' - that is, intellectual performance." One suggestion in the workshop to remedy this situation is to use Bloom's Taxonomy of Cognitive Development (see *Taxonomy of Educational Objectives: The Classification of Educational Goals; Handbook I: The Cognitive Domain*, Bloom, B.S., ed. (1954)) as the basis for constructing tests. In this scheme, a typical test would be constructed so that the following guidelines are followed: 10% for Knowledge, 10% for Comprehension, 15% for Application, 15% for Analysis, 25% for synthesis, and 25% for Evaluation. To illustrate the differences between these, knowledge questions use action verbs like define, find, draw, and state; comprehension questions use action verbs like describe, give examples, and interpret; application questions use verbs such as construct, convert, and solve; analysis questions use verbs like deduce,

determine, and simplify; synthesis questions use verbs such as derive, generalize, and summarize; and finally, evaluation questions use verbs like describe, justify, interpret, and validate. Notice that higher percentages are awarded for the higher-order thinking skills.

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## DEPARTMENT NEWS

**Dr. Y. You** gave an invited presentation on "Nonuniformly attracting inertial manifolds and stabilization of beam equations with Balakrishnan-Taylor damping" at the SIAM 40th Anniversary Meeting, July 1992, Los Angeles. Dr. You also gave an invited presentation on "A global existence theorem on nonlinear evolution equations" at the First World Congress of Nonlinear Analysts, August 1992, Tampa.

**Dr. M.E.H. Ismail** has become a collaborating problem editor for the Monthly, and has agreed to be an editor for a new journal

called *Methods and Applications of Analysis*, founded by S.T. Yau. He is also serving as a guest editor for a special issue of the *SIAM Journal on Mathematical Analysis* dedicated to R. Askey and F. Olver on the occasion of their 60th and 70th birthdays, which will appear in January 1994. A minisymposium (9 speakers) on special functions and orthogonal polynomials, co-organized by Dr. Ismail and Dr. C. Dunkl, was held as part of the summer meeting for SIAM in Los Angeles in July. In addition, Dr. Ismail received the Distinguished Scholar Award at the Honors Convocation Ceremony held on October 16, 1992.

**Dr. E. Saff, Dr. V. Totik and Dr. M.E.H. Ismail** received a grant from the National Science Foundation.

**Dr. R.W.R. Darling** gave a contributed talk on "Hurricane Risk Assessment" at the Workshop on Environmental Modeling at the Institute for Mathematics and its Applications, Minneapolis, July 19-25, 1992.

**Dr. G. McColm** gave a talk, "Pebble Games Defining Logical Queries," at the NSF-INRIA Workshop on Databases and Finite Model Theory in June; listened to Erich Gradel, U. of Basel, present their joint paper, "Deterministic versus Non-Deterministic Transitive Closure" in the 7th IEEE Symposium on Logic in Computer Science (LICS '92) in June; and presented a joint paper with Gradel, "Hierarchies in Transitive Closure Logic, Stratified Datalog, and Infinitary Logic", in the 33rd IEEE Conference on Foundations

of Computer Science (FOCS '92) in October.

## STUDENT NEWS

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

### *M.A. in Mathematics*

Peter DiCroce  
Kevin Frenzel  
Anthony LaMarc  
Daniel Majchrzak  
Paul Martin  
Sean Murphy

### *Ph.D. in Mathematics*

Tony Yu Chang  
Xiaoyan Liu  
Nalina Suresh

## CENTER FOR MATHEMATICAL SERVICES

Last summer, the Center conducted three programs for gifted and secondary school students in the Tampa Bay area. The "Mathematics and Engineering Program" was directed by Dr. Joseph Liang with Drs. S. Campbell and R.K. Nagle instructing. It had 33 first year students, 12 second year, and 3 third year. The following students received an Award of Overall Excellence: Janet Castle, Bloomingdale HS; Miriam Goldstein, Berkley Prep; Andrew Knight, Bloomingdale HS; Katherine King, Chamberlain HS. The "Biomedical and Life Science Program" was directed by Dr. Robert Potter in Chemistry with Dr. Marvin Alvarez instructing. It had 27 first year students, 8 second year, and 3 third year. Megan Nelson of River Ridge HS received the Award of Overall

Excellence. The junior high "Mathematics and Science Program" was directed by Dr. M.N. Manougian with Drs. R. Clapp, M. Defant, R.K. Nagle, and Mrs. Margaret Yoder and Jun Cao instructing. It had 67 first year students and 24 second year students. The following students received an Award of Overall Excellence: Daniel Neill, Buchanan JHS; Frank Lupo, Land O'Lakes JHS.

Last year in the "Lectures on Mathematics in Today's World" lecture program we gave 130 lectures to approximately 4,000 students in the neighboring 9 counties. There were 7 business professionals involved in the program representing Barnett Bank, IBM, Publix Supermarkets, Tampa Electric, and U.S. Sugar Company. USF lecturers included: Drs. I. Bello, R. Darling, R.K. Nagle, M. Parrott, K. Pothoven, C. Williams, and F. Zerla. This program is sponsored by a grant from the Center for Excellence in Mathematics, Science, Computers, and Technology. The 1992-1993 lecture program has started. Contact Dani Bagarella or Maureen Kearsse at (813) 974-4068 to schedule a free lecture.

## INSTITUTE FOR CONSTRUCTIVE MATHEMATICS

The Institute has acquired a new research assistant, Michael Borz from Eckerd College, to assist in the continuing study on the prediction of tropical cyclones.

A new grant proposal has been submitted to the National Institutes of Health concerning the application of wavelets to digital mammography. This

# \*\*\*NOTICE\*\*\*

## *SPRING MATH COURSES AT USF*

The Math Department at USF is offering the following courses that may be of particular interest.

<u>Cr.</u>	<u>Ref.#</u>	<u>Course No.</u>	<u>Title</u>	<u>Days</u>	<u>Time</u>	<u>Place</u>
3	5177	AST 3930-901	Astronomy for Teachers	M	05:00-07:50	CHE 205
3	5178	AST 3930-902	Exploration of Space	T	06:00-07:50	PHY 109
3	1261	MAD 3100-901	Discrete Mathematics	MW	06:00-07:50	LIF 267
3	1271	MAS 4301-001	Elem. Abstract Algebra	MWF	11:00-11:50	CHE 203
3	5180	MAT 4930-001	Elem. Number Theory	MWF	10:00-10:50	CHE 201
3	1274	MAT 4930-901	Elem. Number Theory	TR	06:00-07:15	CHE 105
3	1275	MAT 4930-902	Elem. Number Theory	TR	06:00-07:15	CPR 126
3	5179	MHF 4403-001	Early History of Math.	MW	04:00-05:15	CHE 201

In 1966, the "Cultural Revolution" smashed his dream. Prof. You was assigned a job in a copper mine of a metallurgical company in central China. He worked as an underground miner for 4 years and experienced several life-threatening events. During those hopeless years and later on as a technician, he read a lot of non-mathematical books and built a true friendship with labor workers. In 1976, he married his wife, Hui Min, and they have a daughter, Yingyu.

After quitting mathematics for nine years, Prof. You returned to Fudan and received the M.S. degree there. In 1982, J.L. Lyons visited China and was strongly impressed by Prof. You's work on the optimal control of infinite dimensional systems and the operator Riccati equations. Prof. You was invited to pursue graduate studies toward Docteur d'Etat in France. Lyons preregistered him in l'Universite de Paris VI and preassigned three topics for his dissertation. Prof. You worked two weeks and achieved a complete solution to the first topic (the necessary and sufficient conditions for determining the escape time of blow up of infinite dimensional operator Riccati equations). But for some unjustified reasons, he was held by Fudan to serve three more years and, thus, missed that opportunity.

He came to the University of Minnesota in 1986, where he studied two years under the guidance of Regents' Professor L. Markus, and received the Ph.D. degree in 1988. As an anecdote, in his written qualifying exam, Dr. You found a complete solution to an open problem of the six-parameter classification on stability for 2D critical ordinary differential equations with quadratic nonlinearity. This surprised the Senior Professor, W.S. Lord, who assigned that question and knew only a very partial solution.

Due to his visa restriction, Dr. You accepted visiting positions in Purdue University and the University of Minnesota for several years. As his practical training time ran out in Spring 1990, Dr. You received the Canadian National SERC Postdoctorate Fellowship sponsored by the University of Ottawa, which he declined. He came to our department later that year, where he is now an Associate Professor.

Dr. You's primary research interests have been in the analysis and control of infinite dimensional dynamical systems generated from partial differential equations. He has published 58 papers, received several awards, and delivered many invited presentations. He and George Sell are writing a book on infinite dimensional dynamical systems.

After suffering much in his youth, Dr. You feels that time is no longer on his side and that he must work hard to recapture his dream, not of enjoyable life or sensational achievements, but of a calm piece of mind with which he can explore freely the real infinity.

## CHAIRMAN'S COMMENTS

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In practice, following this procedure on a typical algebra test, the test would be constructed so that questions range from knowledge questions like "state Descartes Rule of Signs" or "give the definition of a rational root" (10% of the test) to synthesis and evaluation questions like "summarize methods of determining information about the location and values of all real roots of an  $n$ th degree polynomial" or "prove Descartes Rule of Signs" (50% of the test).

These thoughts made me question whether my expectations are too low when I construct tests for student assessment and whether I am underassessing student "know-how with knowledge". Perhaps the guidelines presented are worth considering for many mathematics educators.

## FALL COLLOQUIA

Some Problems in Multivariate Nonlinear Approximation, presented by Pencho P. Petrushev, University of Sofia, Bulgaria.

The Sitnikov Problem - New Insights, presented by Rudolph Dvorak, University of Vienna, Austria.

proposal is in collaboration with faculty from the Department of Radiology and the Department of Computer Science.

The Institute will receive funding from the Pharmacology Department at Bay Pines V.A. Hospital to support a research assistant to work on mathematical pharma-kinetics.

### MAA NEWS

The annual Suncoast Regional Meeting of the Florida Section of the MAA will be held at Florida College in Temple Terrace. Dr. Charles Goodall is coordinating the meeting, which will be held on Friday afternoon, December 4, 1992, concluding with a dinner that evening. Participants from the University of South Florida include Fredric Zerla, Athanassios Kartsatos and David Kaplan, Mathematics; Michaele Chappell and Dennisse Thompson, Mathematics Education; and Joseph Aubel, Physics.

Plans are being made for the annual meeting of the Florida Section of the MAA at the University of Central Florida in Orlando on March 6 & 7, 1993. Students, teachers and just people who enjoy mathematics are encouraged to take advantage of this statewide meeting.

For more information on either of these meetings, contact Fredric Zerla, Department of Mathematics.

### STUDENT CLUBS

The Florida Epsilon chapter of Pi Mu Epsilon and the USF Student Chapter of the MAA

continue their joint meetings this year. At the first meeting of the year, the new president of Pi Mu Epsilon, Christopher Miller, gave his Presidential Address, "Off Into Space", with examples that some problems in two dimensions are easier to solve if they are viewed as three dimensional problems. The second talk also featured a student. Timothy Ryder, Vice President of the Student Chapter, presented "An Explanation of Strang's Strange Figures". In the point-by-point plotting of the graph of a function, the eye sometimes creates patterns of points which are not warranted by any analysis of the function. Tim used as an example patterns arising in the graph of the sine function. The speaker at the third meeting was Dr. Samuel J. Garrett, Professor of Electrical Engineering, who discussed "Applied Mathematics in Engineering". Professor Garrett joined the USF Engineering Faculty in 1967 and has worked with members of the Mathematics Faculty frequently ever since.

### ALUMNI NEWS

Nalina Suresh (Ph.D. 1992) is an Assistant Professor in the Department of Mathematics at the University of Wisconsin-Eau Claire.

James C. Bishop (M.A. 1991) is a Mathematics Instructor at the Daytona Beach Community College. He spent the 1991-1992 academic year teaching full-time at two of DBCC's branch campuses located in New Smyrna Beach and DeBary.

Rawleigh L. Sallee (M.A. 1969) is a Mathematics Teacher at Osceola High School in Kissimmee.

Xinlong Weng (Ph.D. 1990) is an Assistant Professor in the Department of Mathematics at Marshall University in Huntington, West Virginia.

Timothy W. Terry (M.A. 1980) has just completed his 15th year as the Mathematics Department Chairman at Lemon Bay High School in Englewood. In addition, this also marks his 24th consecutive semester as an adjunct instructor at the Sarasota Campus of USF.

James H. Clair (M.A.) has just been promoted to the position of Senior Biometrician within the Biometrics Research Department at Merck Research Laboratory in West Point, where he has been employed since 1987.

### FACULTY PROFILE

Yuncheng You was born in 1946 in Shanghai, China. His father is a senior engineer of rubber chemistry and received his M.S. degree from Akron University. In 1963, as the total score champion in Shanghai of the National Unified University Admissions Examinations, Prof. You was enrolled in the Mathematics Department of Fudan University. He completed all the major and minor courses in two and a half years with full credit in all the exams. He was granted permission to jump to the post-senior year and individually study functional analysis under the guidance of Prof. D. Xia, who was a student of Gelfand.

