



Announcing

A Mathematics Seminar

April 24, 2009 at 2:00 pm

SH 303

at The University of Southern Mississippi

Speaker: Tongsong Jiang

Department of Mathematics

Linyi Normal University, Shandong, P. R.China

Title: An Introduction to Quaternions and Matrices of Quaternions

Abstract:

Quaternions were first introduced by Irish mathematician Sir William Rowan Hamilton in 1843. A quaternion x is a number that has a form of $x = x_0 + x_1i + x_2j + x_3k$, $i^2 = j^2 = k^2 = -1$, $ij = -ji = k$, in which x_0, x_1, x_2, x_3 are real numbers. Quaternions are non-commutative extension of complex numbers. In recent years, applications of quaternions and matrices of quaternions are getting more and more important and extensive in quantum mechanics, quantum chemistry, control theory, engineering, robotics, and aerospace etc. By means of complex representations of quaternions and quaternion matrices and companion vector, a new algebra structure of quaternions is given. By introducing definitions of determinant and rank of a quaternion matrix, we derive a technique of finding an inverse matrix of a quaternion invertible matrix, and give a Cramer rule for quaternionic linear equations. We also study the problems of eigenvalues and eigenvectors of quaternion matrices, and give a technique of computing the eigenvalues and eigenvectors of the quaternion matrices in quaternionic quantum mechanics.

Further Information

Further details and information about this and other departmental activities is available online at http://www.math.usm.edu/bulletin_board/.