

Graduate Student Seminar

Speaker: Eric Wawerczyk

University of Notre Dame

Date: Monday, January 27, 2014

Time: 4:15 pm

Location: 229 Hayes-Healy Hall

Title: Universal Quadratic Forms and Arithmetic in Quaternion Algebras

Abstract:

The object of study will be integral discrete subrings of division quaternion algebras over the rational numbers such that the Norm Form restricted to the subring is universal. Lagrange's Theorem states that every natural number, n , can be represented as a sum of four squares $(n=a^2 + b^2 + c^2 + d^2)$. This means that the quadratic form $(w^2 + x^2 + y^2 + z^2)$ is universal over the integers, i.e. it represents all natural numbers. This quadratic form can be realized as the Norm form of the Hamilton quaternion algebra $(-1, -1, \mathbb{R})$. In general, given a field F and two non-zero elements, a and b , of F , we can construct a quaternion algebra denoted $(a,b / F)$. In these quaternion algebras we can find systems of arithmetic (discrete subrings). The goal of the talk will be to answer the question: How many different universal quaternionic integer systems are there and where do they live?