Queen's Algebraic Geometry
— Seminar —

Counting the Number of Complete Subgraphs in the Paley Graph

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Abstract

Let p be a prime number congruent to 1 modulo 4 and let $\mathbb{F}_p$ be a finite field with p elements. The Paley graph with p vertices is defined as the graph having the vertex set $\mathbb{F}_p$, where two vertices are adjacent if and only if their difference is a square of in $\mathbb{F}_p$.

In this talk, I will discuss the problem of counting the number of complete subgraphs in the Paley graph. The goal is to show that determining the number of such subgraphs can be reduced to counting the number of rational points on a certain variety over $\mathbb{F}_p$.

The problem of counting the number of complete subgraphs in the Paley graph arose from the problem of computing the Chern classes of a certain stable rank two reflexive sheaves on projective space constructed by N. Sasakura at the beginning of 1990's. This rank two reflexive sheaf can be viewed as a generalization of the so-called Horroks-Mumford bundle, which is essentially the only indecomposable rank two vector bundle on projective fourspace known to exist over the complex numbers. If time permits, I would like to talk about the construction of this reflexive sheaf.

Monday 9 January 2012
16:30 – 17:30
319 Jeffery Hall