

THE MATHEMATICS DEPARTMENT PRESENTS

A MATHEMATICS COLLOQUIUM

WEDNESDAY, October 22, 2008

BOND HALL 217

4:00 pm

Title: Light Matrices of Prime Determinant

Speaker: Alfred Hales, Center for Communications Research

Abstract: Let p be a prime and consider all square integer matrices A of determinant p . Let $w(p)$ be the minimum, over all such $A = (a_{ij})$, of the *weight* of A , i.e. the sum of the absolute values of the entries a_{ij} . What can be said about the ratio $w(p)/\log(p)$ as p increases? We show that, taking logarithms base 2,

$$\lim_{p \rightarrow \infty} w(p)/\log(p) = 5/2.$$

This can be interpreted as just a result about matrices, or as a result about addition chains, or as a result about short presentations of the simplest simple groups. Fermat primes play a special role in this result.

Refreshments will precede the talk at 3:30pm in Bond Hall 300.