

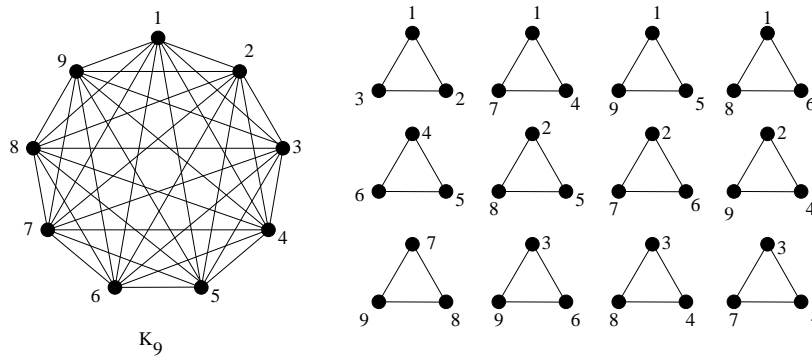
The University of Queensland
DEPARTMENT OF MATHEMATICS
COLLOQUIUM

Speaker: Professor Curt Lindner, Auburn University, U.S.A.
Title: Affine Planes and Orthogonal Latin Squares

When: 2 p.m. Monday 6th June 2005
Where: Room 67-141

ABSTRACT

Denote by K_m the complete undirected graph on m vertices. In design theory vernacular, an *affine plane* of order n is an edge disjoint decomposition of K_{n^2} into copies of K_n .



An affine plane of order n is equivalent to $n - 1$ mutually orthogonal $n \times n$ latin squares. So, for example, the affine plane of order 3 given above is equivalent to the two 3×3 orthogonal latin squares

1	2	3
3	1	2
2	3	1

1	2	3
2	3	1
3	1	2

It is easy to construct $n - 1$ mutually orthogonal $n \times n$ latin squares whenever n is a power of a prime (a finite field construction). Hence there exists an affine plane of order n whenever n is a power of a prime. The most famous problem in finite geometry asks whether or not there exists an affine plane of non prime power order. To date there is not a single example of an affine plane of non prime power order nor is there a proof that the spectrum for affine planes is precisely the same as for finite fields. The “closest” anyone has come to an affine plane of non prime power order consists of 5 mutually orthogonal 12×12 latin squares.

This is a very elementary talk on the status of this very interesting problem.

All interested are welcome.

Afternoon tea at 3pm in the Priestley tea room (67-704) after the talk??.