Graduate Seminar

First Speaker:

Kathleen Barnetson,

Memorial University

Thursday, January 30, 2014

1:00 p.m., HH-3017

The Key Player Problems on Graphs

Abstract:

Given a graph G and an integer k, the Key Player Problem asks for the set of k vertices whose removal will maximally disconnect the graph. In this talk I will present a new formulation of the Key Play Problem as a decision problem, which we have shown to be NP-complete. I will also describe a complementary problem which asks for the k vertices best situated to disperse information across a graph, if for example the graph is modelling a social network. Both problems revolve around the identification of "central" vertices in graphs. Finally I will describe our current progress on the case where k is equal to the vertex connectivity of the graph.

Second Speaker:

Robert Luther,

Memorial University

Equitably Colourable Combinatorial Designs

Abstract:

For a combinatorial object of order v, the associated *spectrum problem* is the problem of determining all necessary and sufficient conditions on v so that the object can and will exist. We will investigate the spectrum problem for equitably ℓ-colourable balanced incomplete block designs.

Suppose we have a BIBD(v,k,λ) in which the points are coloured with ℓ colours $c_1,\ldots,c_\ell$. A block B is *equitably ℓ-coloured* if B has n_i vertices coloured with colour c_i $(i=1,\ldots,\ell)$ and $|n_i-n_j|\leq 1$ for any $i,j\in\{1,\ldots,\ell\}$. A design is *equitably ℓ-colourable* if the points can be coloured with ℓ colours such that every block is ℓ-coloured. Here the associated spectrum problem is the problem of determining conditions on v such that an equitably ℓ-coloured (v,k,λ)-BIBD exists for fixed ℓ, k, and λ.

This problem was inspired by some recent research on equitably ℓ-colourable m-cycle decompositions of the complete graph.