

Discrete Mathematics Seminar

Time: Friday, 16 November 2012, 2:00–3:00 PM

Location: 238 Derrick Hall

Title: Towards an Oriented Hypergraphic Matrix-Tree Theorem

Speaker: Dr. Lucas Rusnak, Mathematics Department

Abstract:

One aspect of algebraic graph theory involves the examination of matrices associated to certain graph structures and the relationships between them. We will discuss the combinatorial relationships between the adjacency, incidence, degree, and Laplacian matrices of a graph. These matrices contain information about the cycle structure, the number of walks between two vertices, the number of spanning trees, and natural flows associated to each edge based on the structure of the graph.

These results have been generalized (with varying degrees of success) to directed graphs, signed graphs, oriented hypergraphs, and matroids. We will examine some of these generalizations and how they relate to graph complexity, a generalized matrix-tree theorem, basis counting in matroids, and non-conservative generalizations of Kirchhoff's Laws.