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Discrete Mathematics Seminar

Time: Friday, April 12, 2019, 2:15-3:15 PM
Room: 330 Derrick Hall
Title: Gain graphs, Oriented Hypergraphs and Matrices
Speaker: Dr. Nathan Reff, Associate Professor of Mathematics, SUNY Brockport

Abstract:

A gain graph is a graph where each orientation of an edge is given a group element, which is the inverse of the group element assigned to the opposite orientation. Complex unit gain graphs have particularly nice matrix properties which I will discuss.

An oriented hypergraph is a hypergraph where each vertex-edge incidence is given a label of +1 or -1. The adjacency and Laplacian eigenvalues of an oriented hypergraph are studied. In particular, combinatorial bounds are found which relate structural parameters to these eigenvalues. Some hypergraph cycle and path families will have their spectra fully determined.

If time permits, I will mention some potential projects related to these structures and their applications to chemical reaction networks and Hadamard matrices.