

Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, January 27

Speaker: Kevin M Grace, Vanderbilt University

Dyadic Matroids with Spanning Cliques

The notion of a matroid is an abstraction of dependence in linear algebra and graph theory. The Matroid Minors Project of Geelen, Gerards, and Whittle describes the structure of minor-closed classes of matroids representable over a fixed finite field. To use these results to study specific classes, it turns out to be important to study the matroids in the class that contain spanning cliques. A spanning clique of a matroid M is a complete-graphic restriction of M with the same rank as M .

In this talk, we will describe the structure of dyadic matroids with spanning cliques. The dyadic matroids are those matroids that can be represented by a real matrix each of whose nonzero sub-determinants is a power of 2, up to a sign. A subclass of the dyadic matroids is the signed-graphic matroids. In the class of signed-graphic matroids, the entries of the matrix are determined by a signed graph. Our result is that dyadic matroids with spanning cliques are signed-graphic matroids and a few exceptional cases.

The main results in this talk will come from joint work with Ben Clark, James Oxley, and Stefan van Zwam. The talk will include a brief introduction to matroids.

