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Realization Spaces of Phased Matroids

Abstract for the Combinatorics Seminar 2013 May 13

Phased matroids are combinatorial objects, recently defined by Anderson and Delucchi, that play the same role for complex vector spaces as oriented matroids do for real vector spaces. A phased matroid is a matroid with additional structure that generalizes orientation.

According to Mnëv's Universality Theorem, for those phased matroids which are complexified oriented matroids, the realization space can be arbitrarily complicated. In contrast, phased matroids which are not essentially oriented have remarkably simple realization spaces if they are uniform or have rank ≤3.

I will introduce tools that are useful in proving my results. I will also present some constructions of phased matroids which are not essentially oriented but have realization spaces as complicated as those for oriented matroids.

Finally, I present a criterion for realizability of uniform phased matroids that are not essentially oriented.

This is Ms. Ruiz's dissertation defense. The examining committee is Laura Anderson (chair), Marcin Mazur, Thomas Zaslavsky, and special guest Gary Gordon (Lafayette College). All interested persons are welcome to attend.
