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Realizations of Complex Matroids

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Complex matroids are combinatorial objects, recently defined, that play the same role for complex numbers as oriented matroids do for real numbers. They are a combinatorial abstraction of vector configurations in \mathbf{C}^n , which consist of the underlying matroid with additional structure that generalizes orientation.

In this talk I will give a brief introduction to complex matroids and discuss some preliminary results about their realization spaces. In contrast to oriented matroids, which Mnëv's Universality Theorem says can be arbitrarily complicated, realizations of complex matroids are rigid; that is, the realization space is a single point. Also, while there does not exist an interesting criterion for realizability of oriented matroids, I will present a relatively simple necessary criterion for realizability for complex matroids.

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