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The critical fan of a matroid

It is well-known that complex hyperplane arrangements can be conveniently resolved to normal crossing divisors with the help of the permutohedral toric variety. The cohomology algebras of the resulting wonderful compactifications are not only matroid invariants, but Adiprasito, Huh and Katz (2015) found that Hodge-theoretic constraints imposed on them by complex geometry persist for arbitrary matroids.

The maximal likelihood variety of a complex arrangement describes the set of critical points of all rational functions with poles and zeros on the arrangement. This variety's bidegree encodes the h-vector of the underlying matroid's broken circuit complex. I will describe work with Federico Ardila and June Huh that constructs a tropical version of the maximal likelihood variety, with which we can study the h-vector of the broken circuit complex of an arbitrary matroid.