A lattice point counting generalisation of the Tutte polynomial

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Résumé

The Tutte polynomial for matroids is not directly applicable to polymatroids. For instance, deletion- contraction properties do not hold. We construct a polynomial for polymatroids which behaves similarly to the Tutte polynomial of a matroid, and in fact contains the same information as the Tutte polynomial when we restrict to matroids. This polynomial is constructed using lattice point counts in the Minkowski sum of the base polytope of a polymatroid and scaled copies of the standard simplex. We also show that, in the matroid case, our polynomial has coefficients of alternating sign, with a combinatorial interpretation closely tied to the Dawson partition.

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