

Permutation Polytopes

A permutation polytope is the convex hull of the permutation matrices of a subgroup of S_n . These polytopes are a special class of 0/1-polytopes. A well-known example is the Birkhoff polytope of all doubly-stochastic matrices. This polytope is defined by the full symmetric group S_n . While this is a well studied polytope, much less is known for general groups.

I will start with a discussion of basic properties of permutation polytopes, combinatorial characterizations, and show connections between the group and the polytope. The main focus of my presentation will be on recent results for permutation polytopes defined by cyclic groups. This class contains the family of marginal polytopes studied in statistics.

This is joint work with Barbara Baumeister, Christian Haase, and Benjamin Nill.