

Finite groups as symmetry groups of polytopes

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Convex polytopes come with different symmetry groups attached to them. Most important are the geometric symmetry group, consisting of the isometries that preserve the polytope, and the combinatorial symmetry group, consisting of the face-preserving permutations of the vertices. In between, there is the affine symmetry group of a polytope. It is known that every finite group can be realized as the geometric/ affine/ combinatorial symmetry group of some polytope. As there are in fact many polytopes whose symmetry group is a given group G , this leads to natural questions like: Given a group G , what is the minimal dimension of a polytope with symmetry group G ? What is the minimal number of orbits on the vertices? In our talk, we will survey some recent and not so recent results on questions of this type, and also point out some open problems.

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