

## Dehn functions and automorphisms of Coxeter groups

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The use of geometric methods has led to significant advances in the theory of groups. This approach has opened many avenues for new research and provided insight into long-standing problems.

Coxeter groups, which are a natural generalization of the symmetry groups of polyhedra, are especially amenable to study via geometric methods. For example, it is known that every Coxeter group acts “geometrically” on a CAT(0) space and, as a consequence, has many desirable properties (eg., solvable conjugacy problem). In contrast, the automorphism groups of Coxeter groups are not, in general, well understood. In this project we will explore the geometry and combinatorics of the automorphism group of a right-angled Coxeter group  $W$ . Specifically, we will focus on obtaining a characterization of the Dehn function of  $Aut(W)$ , (the Dehn function of a group  $G$  measures the intrinsic complexity of the word problem for  $G$ ). It is known that in certain cases,  $Aut(W)$  is a virtual Coxeter group; when this occurs, the Dehn function of  $Aut(W)$  is bounded above by a quadratic polynomial. The goal of this project will be to extend this result to arbitrary right-angled Coxeter groups.

Students are expected to have a strong background in linear and abstract algebra. Programming skills and/or some background in geometry/topology is desirable but not required.