

# The type A Coxeter complex in algebraic combinatorics

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## Abstract

Coxeter complexes are simplicial polytopes derived from certain reflection groups. The type  $A_{n-1}$  Coxeter complex is derived from the symmetric group  $S_n$  and admits an elegant combinatorial description. Its faces are identified with set compositions and certain combinatorial properties of these compositions can be explained geometrically. Aguiar and Mahajan used this geometry to define a product and coproduct on various vector spaces, thereby endowing them with the structure of a combinatorial Hopf algebra. This talk will be an overview of their work.

**Keywords:** Coxeter complex, simplicial polytopes, Hopf algebra.