

Flow Polytopes and Framing Lattices

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Flow polytopes of acyclic oriented graphs arise naturally in combinatorial optimization, and the study of their volumes and triangulations has revealed intriguing connections across combinatorics, geometry, algebra, and representation theory.

In this talk, we introduce the *framing lattice* associated with a framed graph, whose Hasse diagram is dual to a framed triangulation of the corresponding flow polytope. Framing lattices are remarkable in that they provide a unifying framework encompassing many classical and well-studied lattice structures, including the Boolean lattice, the Tamari lattice, and the weak order on permutations. They further subsume a broad array of examples such as all type-A Cambrian lattices, the Grassmann and grid-Tamari lattices, the alt-v-Tamari and cross-Tamari lattices, the permutree lattices, and the τ -tilting posets of certain gentle algebras.

We will discuss structural properties of framing lattices, their connections to noncrossing partitions via Reading's core label orders, and several of their lattice congruences and quotients.

This is joint work with Matthias von Bell.