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Anton Dochtermann* (dochtermann@math.utexas.edu). *Commutative algebra of generalized permutohedra.*

Realized as signed sums of simplices, the vertices and lattice points of ‘generalized permutohedra’ give rise to various monomial ideals. These include the class of matroidal ideals as well as certain artinian ideals with appealing combinatorial structure. We study cellular resolutions of these ideals and seek to interpret their Betti numbers - a simple motivating example is the Koszul resolution of the maximal ideal supported on a simplex.

For example we show that the ideal generated by the lattice points of a sum of simplices (of various dimensions) has a minimal resolution supported on any regular subdivision of the underlying polytope. These ideals are closely related to initial ideals of ‘ladder determinantal ideals’, and the polyhedral complexes supporting the resolutions are connected to the geometry of ‘tropical’ hyperplane arrangements. We discuss some combinatorial and algebraic applications of our results, including connections to a notion of generalized chip-firing. This is joint work with Alex Fink and Raman Sanyal. (Received September 22, 2015)