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Cyclic polytopes and representation theory

Oppermann and Thomas show how the representation theory of Iyama's higher Auslander algebras of type A (A_n^d) is related to triangulations of even-dimensional cyclic polytopes. We show how two natural partial orders on the set of triangulations of a cyclic polytope, the higher Stasheff–Tamari orders, can be interpreted on the representation-theoretic side as well-known orders on silting complexes introduced by Aihara and Iyama. This allows one to interpret triangulations of odd-dimensional cyclic polytopes within the representation theory of A_n^d, namely, as equivalence classes of d-maximal green sequences. This allows the higher Stasheff–Tamari orders to be interpreted algebraically in odd dimensions too. Finally, we prove the 1996 conjecture of Edelman and Reiner that the two higher Stasheff–Tamari orders are equal, and thereby obtain new results on the representation theory of A_n^d.