

Representation theory of preprojective algebras and Coxeter groups

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One of the most fundamental connections between the quiver representation theory and the root system is the Gabriel's bijection, that is, a bijection between indecomposable modules of the path algebra of a (simply-laced) Dynkin quiver Q and the positive roots of Δ , where Δ is the underlying graph of Q .

Recently, it has turned out that preprojective algebras allow us to give a nicer connection. Namely, the preprojective Λ_Δ , which unifies the representation theory of different quivers with the same underlying graph Δ , gives a representation-theoretical realization of the Weyl group of Δ . This fact leads to several studies of connections between representation theory of preprojective algebras and combinatorics of the Weyl group. In this talk, we explain a recent study of tilting (τ -tilting) theory of preprojective algebras and its relationship with the Coxeter groups. Moreover we will review a recent result about c -sortable elements and torsion pairs of path algebras via preprojective algebras, which is based on joint work with Hugh Thomas.

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