Mutations for star-to-tree complexes and pointed Brauer trees

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Throughout this talk, let k be an algebraically closed field, G_0 a Brauer star of type (e, m) and B a Brauer star algebra over k associated to G_0.

Let us begin with the definition of the two-restricted tilting complex for the Brauer star algebra B and the fact on this complex.

Definition 1. [2] Let $\hat{T}$ be a tilting complex over a Brauer star algebra B. We call $\hat{T}$ a two-restricted tilting complex if any indecomposable direct summand of $\hat{T}$ is a shift of the following elementary complex, where the first nonzero term is in degree 0.

- $S_i : 0 \to Q_i \to 0$,
- $T_{jk} : 0 \to Q_j \xrightarrow{h_{jk}} Q_k \to 0$,

where the map h_{jk} has maximal rank among homomorphisms from Q_j to Q_k.

Theorem 2. [2] *There is a one-to-one correspondence between the set of multiplicity-free two-restricted tilting complexes for the Brauer star algebra B and the set of pointed Brauer trees of type (e, m).*

On the other hand, in [1], it is shown that any representation-finite symmetric algebra is tilting-connected, so any Brauer tree algebra is a tilting-connected algebra. Hence, for any two-restricted tilting complex $\hat{T}$ for the Brauer star algebra B, there must exist a sequence of irreducible mutations converts B to $\hat{T}$. Regarding this fact, in [3] they give a sequence of irreducible mutations converts B to $\hat{T}$ in the case that $\hat{T}$ corresponds to the pointed Brauer tree with the reverse pointing or the left alternating pointing.

In this talk, for any two-restricted tilting complex $\hat{T}$, we give an algorithm to find such a sequence of mutations from the pointed Brauer tree to which $\hat{T}$ corresponds.

References

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