

GEOMETRIC CONSTRUCTION OF DG-ENHANCED VERSIONS OF NIL-HECKE ALGEBRAS

RUSLAN MAKSIMAU

ABSTRACT. This is a joint work with Catharina Stroppel.

Khovanov-Lauda and Rouquier defined KLR algebras to categorify quantum groups. Varagnolo-Vasserot and Rouquier gave a geometric construction of KLR algebras in terms of homology of the Steinberg variety.

Cyclotomic quotients of KLR algebras allow to categorify simple modules for quantum groups. To categorify Verma modules, Naisse and Vaz defined DG-enhanced versions of KLR algebras. The idea of their construction is to add “floating dots” to the KLR diagrammatics.

It is natural to look for a geometric construction of these new algebras. In this talk I will explain how to do this in the \mathfrak{sl}_2 case: for nil-Hecke algebras. This geometric construction also sees the differential.

The geometry also suggests that Naisse-Vaz algebras should be considered as subalgebras of bigger algebras. These algebras also contain creation and annihilation operators for floating dots.