

Hausel's big algebras, commuting differential operators and Bethe subalgebras of the Yangian

Nhok Tkhai Shon Ngo

Institute of Science and Technology Austria (ISTA)

Recently, Hausel introduced the notion of a "big algebra" associated to a representation of a complex reductive Lie algebra. These algebras are commutative, capture a lot of representation-theoretic information, and are also related to the geometry of the affine Grassmannian. In this talk, we explain how these algebras are defined and discuss in more detail the big algebras associated to two special \mathfrak{gl}_n -modules: the symmetric and exterior algebras of the affine space of $n \times r$ matrices. Finally, we present some explicit formulas for generators of the corresponding big algebras in terms of differential operators with polynomial coefficients. These formulas allow us to relate type A big algebras to Bethe subalgebras of the Yangian $Y(\mathfrak{gl}_n)$, and, as a by-product, to reprove the commutativity of big algebras in type A. Based on preprint arXiv:2501.04605.