

ALGEBRA SEMINAR

Relation between quantum toroidal algebras of \mathfrak{sl}_n and affine Yangians of \mathfrak{sl}_n for different values of n

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ABSTRACT: In the recent work of Gautam and Toledano Laredo, a new relation between the quantum affine algebra $U_q(L\mathfrak{g})$ and the Yangian $Y_{\hbar}(\mathfrak{g})$ of a simple Lie algebra \mathfrak{g} was established by constructing an isomorphism between completions of those two algebras, where $q = \exp(\hbar)$ and \hbar is viewed as a formal parameter. It turns out that their approach can be generalized to construct homomorphisms from the quantum toroidal algebra of \mathfrak{sl}_m (which depends on two parameters q_1, q_2) to a completion of the affine Yangian of \mathfrak{sl}_{mn} (which depends on two parameters \hbar_1, \hbar_2), where $q_1 = \omega \exp(\hbar_1)$, $q_2 = \exp(\hbar_2)$ and ω is an mn -th root of unity. In the particular case of $n = 1, \omega = 1$, we recover the formulas from the case of simple Lie algebras.

We will provide some motivation and describe the aforementioned result of Gautam and Toledano Laredo, which explains the similarities between the representation theories of quantum loop algebras and Yangians as well as provides a new proof of Drinfeld's degeneration result. In the second part of this talk, we will describe our key result. Time permitting we will discuss the classical limit and geometric interpretation of our construction.

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1:30 – 2:30 PM

ROOM 617, WACHMAN HALL
DEPARTMENT OF MATHEMATICS