Yangians and quantum loop algebras

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Wednesday, Oct. 20, 3-4 pm in PSY B53

Tea 2:45-3 in MCS 153

Abstract:

For a semisimple Lie algebra $\mathfrak{g}$, the quantum loop algebra $U_\hbar L\mathfrak{g}$ and the Yangian $Y_\hbar\mathfrak{g}$ are certain deformations of the loop algebra $\mathfrak{g}[z, z^{-1}]$ and the current algebra $\mathfrak{g}[u]$ respectively. These two algebras are very closely related, and are believed to have the "same" representation theory. To mention a few known results relating the quantum loop algebras and the Yangians, we have the following: (a) the finite–dimensional irreducible representations of both these algebras are parametrized by certain rank($\mathfrak{g}$)–tuple of polynomials, called Drinfeld polynomials (b) both these algebras have geometric realizations on the same Steinberg–type variety, and (c) the Yangian can be obtained by a certain degeneration of the quantum loop algebra. Despite these results, no natural relationship between the two algebras is known. In this talk, I will explain how to construct a functor between the finite–dimensional representation categories of these two algebras. This talk is based on a joint work with Valerio Toledano Laredo.