Lie Groups and Representation Theory Seminar
at the University of Tokyo

Date    January 27 (Tue), 2015, 16:30–18:00
Place    Room 126, Graduate School of Mathematical Sciences
Speaker  Hironori Oya (大矢浩德) (the University of Tokyo)
Title    Representations of quantized function algebras and the transition matrices from Canonical bases to PBW bases

Abstract  Let $G$ be a connected simply connected simple complex algebraic group of type $ADE$ and $\mathfrak{g}$ the corresponding simple Lie algebra. In this talk, I will explain our new algebraic proof of the positivity of the transition matrices from the canonical basis to the PBW bases of $U_q(\mathfrak{n}^+)$. Here, $U_q(\mathfrak{n}^+)$ denotes the positive part of the quantized enveloping algebra $U_q(\mathfrak{g})$. (This positivity, which is a generalization of Lusztig’s result, was originally proved by Kato (Duke Math. J. 163 (2014)).) We use the relation between $U_q(\mathfrak{n}^+)$ and the specific irreducible representations of the quantized function algebra $\mathbb{Q}_q[G]$. This relation has recently been pointed out by Kuniba, Okado and Yamada (SIGMA. 9 (2013)). Firstly, we study it taking into account the right $U_q(\mathfrak{g})$-algebra structure of $\mathbb{Q}_q[G]$. Next, we calculate the transition matrices from the canonical basis to the PBW bases using the result obtained in the first step.