REALIZATION OF SIMPLE LIE ALGEBRAS VIA HALL ALGEBRAS OF DOMESTIC CANONICAL ALGEBRAS

HIDETO ASASHIBA

We realize simple complex Lie algebras $\mathfrak{g}(\Delta)$ of Dynkin type $\Delta = A, D, E$ as quotient algebras $L(A)_1^{\mathbb{C}}/I(A)$ of complex degenerate composition Lie algebras $L(A)_1^{\mathbb{C}}$ by some ideal I(A) defined via Hall algebras of domestic canonical algebras A. The preprint in 2004 contained an error and a gap. Namely, the definition of I(A) given there was wrong and a proof of the injectivity of a map $\phi \colon \mathfrak{g}(\Delta) \to L(A)_1^{\mathbb{C}}/I(A)$ defined there had a gap. In fact, under the wrong definition we checked that $L(A)_1^{\mathbb{C}}/I(A) = 0$ in some cases. In this talk we will present a right definition of I(A) and give an outline of the proof of the injectivity of ϕ . In addition, using a notion of Gabriel-Roiter submodules we will give a simpler proof of the fact that for each exceptional A-module X the symbol $u_{[X]}$ corresponding to X is contained in $L(A)_1^{\mathbb{Q}}$.