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Crystal bases for the quantum group $U_q(\mathfrak{gl}(m,n))$

Abstract

Benkart, Kang and Kashiwara constructed a quantum group associated to the Lie superalgebra $\mathfrak{gl}(m,n)$; they also constructed crystal bases for tensor powers of the standard representation V. However, unlike the case of the Lie algebra $\mathfrak{gl}_{m+n}(\mathbb{C})$, we have to take tensor powers of $V \otimes V^\star$ to obtain all simple modules of finie dimension. By weakening the definition of crystal base, I showed that these modules (they are indecomposable but not simple) have crystal bases, and under some conditions we can construct some crystal bases for sub-quotients of these modules.