On combinatorial rank of quantum groups

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It is impossible to define a biideal generated by a given element a (or by a set of elements) because under the decomposition $\Delta(a) = \sum a_{(1)} \otimes a_{(2)}$ the biideal must have one of the elements $a_{(1)}$ or $a_{(2)}$ but not both of them. In general this provides unsolvable ambiguity. At the same time, if a is skew-primitive, then ordinary ideal generated by a is a biideal. The Heyneman-Radford theorem (*a morphism of coalgebras is injective provided that so is its restriction on the first component of the coradical filtration*) allows one to construct any biideal in a number of steps by gaining skew-primitive elements. In this way, any pointed bialgebra gets a combinatorial representation, where the length of the process is precisely the combinatorial rank.

In the talk, we compute the combinatorial rank of the multiparameter version of the small Lusztig quantum group of type A_n and B_n.