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Laura Colmenarejo, Rosa Orellana, Franco Saliola, Anne Schilling*
(anne@math.ucdavis.edu) and **Mike Zabrocki**. *An insertion algorithm on multiset partitions
with applications to diagram algebras.*

We generalize the Robinson-Schensted-Knuth algorithm to the insertion of two row arrays of multisets. This generalization leads to new enumerative results that have representation theoretic interpretations as decompositions of centralizer algebras and the spaces they act on. In addition, restrictions on the multisets lead to further identities and representation theory analogues. For instance, we obtain a bijection between words of length k with entries in $[n]$ and pairs of tableaux of the same shape with one being a standard Young tableau of size n and the other being a standard multiset tableau of content $[k]$. We also obtain an algorithm from partition diagrams to pairs of a standard tableau and a standard multiset tableau of the same shape, which has the remarkable property that it is well-behaved with respect to restricting a representation to a subalgebra. This insertion algorithm matches recent representation-theoretic results of Halverson and Jacobson. (Received June 13, 2019)