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Drew Armstrong (drewarmstrong@gmail.com) and **Hugh Thomas*** (hthomas@unb.ca).

Sorting orders on finite reflection groups and quotient-closed subcategories of representations of quivers.

Let (W, S) be a finite Coxeter system. The first author recently introduced a family of poset structures on W called “sorting orders”, inspired by Reading’s definition of c -sorting. These posets on W are stronger than weak order, weaker than Bruhat order, and are supersolvable join-distributive lattices. These partial orders are defined with respect to a choice of reduced word for the longest element w_0 , but there is a natural choice of reduced word coming from a choice of Coxeter element for (W, S) or, equivalently, from a choice of orientation of the Dynkin diagram for W . Let Q be such an orientation. Suppose (for simplicity, though this is not essential) that Q is simply-laced. Consider the category $\text{rep}(Q)$ of representations of Q . We show that the sorting order on W with respect to the choice of word for w_0 determined by Q , is isomorphic to the set of full subcategories of $\text{rep}(Q)$ which are closed under direct sums, direct summands, and quotients, with the order given by inclusion. This class of subcategories of $\text{rep}(Q)$, while natural, seems not to have been studied before; in particular, even the fact that the number of such subcategories equals $|W|$ seems to be new. (Received February 04, 2008)