

Lattice properties of oriented exchange graphs

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The exchange graph of a quiver is the graph of mutation-equivalent quivers whose edges correspond to mutations. The exchange graph admits a natural acyclic orientation called the oriented exchange graph. Building on work of Iyama, Reiten, Thomas, and Todorov, we show that this directed graph is a semidistributive lattice by using the isomorphism to the lattice of functorially finite torsion classes of the corresponding Jacobian algebra when the exchange graph is finite. Furthermore, if the quiver is mutation-equivalent to a type A Dynkin diagram, then the oriented exchange graph is a lattice quotient of a lattice of biclosed subcategories of modules over the Jacobian algebra, generalizing Reading’s Cambrian lattices in type A.

This is joint work with Thomas McConville.

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