

Lattice theory of torsion classes

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The lattice of torsion classes of the category of modules over a finite-dimensional algebra contains a lot of useful information about the module category. For one thing, even if the module category itself is wild, the lattice of torsion classes can be finite, and thus easier to get a handle on; also, lattice theory brings a new perspective from which to organize our understanding of the module category. In addition to introducing the lattice of torsion classes, I will discuss its connection to tau-tilting theory, and its behaviour under algebra quotients. Along the way, I will introduce important lattice-theoretic concepts such as semidistributivity and lattice quotients. (No prior knowledge of lattice theory will be assumed.) Time permitting, I will also discuss how insights can flow in the opposite direction, as we use the intuition obtained from lattices of torsion classes to understand arbitrary semidistributive lattices.