

Fixed rings of generalized Weyl algebras

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Abstract

Generalized Weyl algebras (GWAs) were introduced by Bavula, but include many classes of algebras that have been studied in other contexts. This includes primitive quotients of $U(\mathfrak{sl}_2)$, ambiskew polynomial rings, and noncommutative deformations of type-A Kleinian singularities. A special class of GWAs, called classical GWAs, includes the first Weyl algebra, $A_1(\mathbb{k})$. Smith proved that for a finite nontrivial subgroup $G \subset \text{Aut}(A_1(\mathbb{k}))$, $A_1(\mathbb{k})^G \not\cong A_1$. This is an example of rigidity for noncommutative rings.

In this talk, I will give a broad overview of the theory of classical GWAs and detail joint work with Rob Won on our efforts to understand their filtered automorphisms and fixed rings. In particular, I will provide an analog of Smith's theorem in the case that A is a classical GWA and G is a finite cyclic group acting on A .