Semisimple Hopf actions and factorization through group actions

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Abstract

Let H be a Hopf algebra over a field F acting on an algebra A. Let $I \subseteq \mathrm{Ann}_H(A)$ be a Hopf ideal of H, then one says that the action of H on A *factors through* the quotient Hopf algebra H/I. If there exists $I \subseteq \mathrm{Ann}_H(A)$ such that $H/I \cong F[G]$, for some group G, we say that the action of H on A *factors through a group action*. In 2014, Etingof and Walton have shown that any semisimple Hopf action on a commutative domain factors through a group action [2]. Also in 2014, using their previous result, Cuadra, Etingof and Walton showed that any action of a semisimple Hopf algebra H on the nth Weyl algebra $A = A_n(F)$, with $\mathrm{char}(F) = 0$, factors through a group action [1].

In this talk we will briefly present a generalization of Cuadra, Etingof and Walton's result. Namely, that any action of a semisimple Hopf algebra H on an iterated Ore extension of derivation type in characteristic zero factors through a group action [3]. We also present a work in progress on semisimple Hopf algebra actions on the quantum polynomial algebras which do not factor through group actions.

This talk is all based on my upcoming Ph.D. Thesis under the supervision of Christian Lomp.

Keywords

Semisimple Hopf Algebras, Hopf actions, Factorization.

References

[1] J. Cuadra, P. Etingof and C. Walton, *Semisimple Hopf actions on Weyl algebras*, Adv. Math. 282 (2015), 47-55.

[2] P. Etingof and C. Walton, *Semisimple Hopf actions on commutative domains*, Adv. Math. 251 (2014), 47-61.

[3] C. Lomp and D. Pansera, *A note on a paper by Cuadra, Etingof and Walton*, Comm. Algebra 45 (2017), no. 8, 3402-3409.