

CONSTRUCTING SEMISIMPLE HOPF ALGEBRAS AND NON-INNER FAITHFUL ACTIONS

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Etingof and Walton (2014) proved that any action of a semisimple complex Hopf algebra on a commutative domain factors through a group action, a result later extended to Weyl algebras, enveloping algebras, and Ore extensions. The eight-dimensional Kac–Paljutkin algebra provides a notable example of a non-trivial semisimple Hopf algebra admitting a non-group-like action on a quantum plane. Pansera subsequently introduced a family of semisimple Hopf algebras of dimension $2n^2$ and a non-inner faithful action on the quantum plane. In this talk, I present a wider family of semisimple Hopf algebras of dimension $n^m m!$ (for $n, m \geq 2$), which includes Pansera’s family. Each of these Hopf algebras is an extension of the group ring of the symmetric group, S_m , and the group ring of the direct product G of m copies of the cyclic group of order n , i.e. an element of $\text{OpExt}(k^G, kS_m)$. As an algebra it is actually isomorphic to the group ring of a generalized symmetric group, i.e. the wreath product of the cyclic group of order n and S_m . We exhibit irreducible m -dimensional representations that are inner faithful and give rise to nontrivial actions on quantum polynomial algebras. Part of this work has been obtained jointly with Sebastian Halbig.