

POINTED HOPF ALGEBRAS OVER NON-ABELIAN GROUPS

GARCÍA IGLESIAS, AGUSTÍN

UNIVERSITÀ DEGLI STUDI DI PADOVA, ITALIA;
FAMAF, UNIVERSIDAD NACIONAL DE CÓRDOBA, ARGENTINA.

ABSTRACT

The class of finite-dimensional pointed Hopf algebras is a field of current active research. The classification of these algebras has seen substantial progress since the development of the so-called “Lifting method” by Andruskiewitsch and Schneider¹. With this tool, the case in which the group of group-like elements is abelian is almost completed and recent results by these and other authors such as Angiono² and Heckenberger³ seem to lead to a very soon completion.

On the other hand, the non-abelian case, though also approachable via this method, is far from being completed. One of the main obstacles is the little amount of known examples of finite-dimensional Nichols algebras (a key structural component of these Hopf algebras) and the lack of intuition on how these objects should behave. However examples do exist and it is expectable that sufficient information about them could throw some light on the general case.

In this talk, we will review the classification of pointed Hopf algebras over the symmetric groups \mathbb{S}_3 and \mathbb{S}_4 , as found in a joint work with G. García⁴. We will also construct Hopf-Galois extensions of these algebras and use them to show that all of them are actually cocycle deformations of their graded versions, which are Radford bi-products of the corresponding Nichols algebra and group algebra. This will allow us to give a classification of the module categories over the categories of representations of these algebras. These results were proved in a joint work with M. Mombelli⁵.

¹Annals of Mathematics **171** No. 1 (2010).

²Submitted (2011).

³Advances in Mathematics **220** (2009).

⁴Israel Journal of Mathematics **183** (2011).

⁵Pacific Journal of Mathematics, to appear.