Etingof, Pavel; Gelaki, Shlomo

Finite dimensional quasi-Hopf algebras with radical of codimension 2. (English)


Let $H$ be a finite dimensional quasi-Hopf algebra over the field of complex numbers. $H$ is called ‘basic’ if all its irreducible representations have dimension 1. This notion is dual, in the Hopf algebra case, to the notion of a ‘pointed’ Hopf algebra. Important classification results for pointed Hopf algebras can be found in the work by N. Andruskiewitsch and H.-J. Schneider [Math. Sci. Res. Inst. Publ. 43, 1-68 (2002; Zbl 1011.16025)] and references therein.

The main result of this paper is the classification, up to twist equivalences and deformations, of basic quasi-Hopf algebras with exactly 2 irreducible representations of dimension 1. Explicitly, it is shown that such a quasi-Hopf algebra $H$ is twist equivalent to a Nichols Hopf algebra, as introduced by W. D. Nichols [in Commun. Algebra 6, 1521-1552 (1978; Zbl 0408.16007)], or else $gr H$ is twist equivalent to some of the special quasi-Hopf algebras $H(2)$, $H_+(8)$, $H_-(8)$, $H(32)$ (of dimensions 2, 8, 8 and 32, respectively), also introduced in this paper. As a corollary the classification of nonsemisimple quasi-Hopf algebras of dimension 4 is obtained. The liftings of the quasi-Hopf algebras $H(2)$, $H_+(8)$, $H_-(8)$, $H(32)$ are not classified in this paper; see the authors’ related preprint [Liftings of graded quasi-Hopf algebras with radical of prime codimension, math.QA/0412143].

Reviewer: Sonia Natale (Cordoba)

MSC:

16T05 Hopf algebras and their applications
16W50 Graded rings and modules (associative rings and algebras)

Keywords:

quasi-Hopf algebras; irreducible representations; pointed Hopf algebras; Nichols Hopf algebras

Full Text: DOI arXiv