Serial and co-Frobenius coalgebras, infinite abelian groups, and a class of quantum groups

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We present some recent classification results of co-Frobenius coalgebra structures on monomial subcoalgebras of path coalgebras, and of an associated class of quantum groups. These coalgebras are also serial coalgebras; we show how some of these results follow alternatively from a classification of left serial coalgebras. We answer several open questions regarding co-representations of such coalgebras, and show how methods of the theory of infinite abelian groups apply to this context. Finally, we look at a conjecture of Andruskiewitsch and Dăscălescu (which states that a Hopf algebra with nonzero integral must have finite coradical filtration); we examine this from the point of view of tensor categories but also from the perspective of such combinatorial examples of co-Frobenius coalgebras, and investigate the question of when an indecomposable co-Frobenius coalgebra must have finite coradical filtration.