

On two finiteness conditions for Hopf algebras with nonzero integral

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Abstract. A Hopf algebra is co-Frobenius when it has a nonzero integral. It is proved that the composition length of the indecomposable injective comodules over a co-Frobenius Hopf algebra is bounded. As a consequence, the coradical filtration of a co-Frobenius Hopf algebra is finite; this confirms a conjecture by Sorin Dăscălescu and the first author. The proof is of categorical nature and the same result is obtained for Frobenius tensor categories of subexponential growth. A family of co-Frobenius Hopf algebras that are not of finite type over their Hopf socles is constructed, answering so in the negative another question by the same authors.

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