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Non-existence of Hopf orders for a twist of the alternating and symmetric groups. (English)
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Summary: We prove the non-existence of Hopf orders over number rings for two families of complex semisimple Hopf algebras. They are constructed as Drinfel’d twists of group algebras for the following groups: $A_n$, the alternating group on $n$ elements, with $n \geq 5$, and $S_{2m}$, the symmetric group on $2m$ elements, with $m \geq 4$ even. The twist for $A_n$ arises from a 2-cocycle on the Klein four-group contained in $A_4$. The twist for $S_{2m}$ arises from a 2-cocycle on a subgroup generated by certain transpositions, which is isomorphic to $Z_{2m}$. This provides more examples of complex semisimple Hopf algebras that cannot be defined over number rings. As in the previous family known, these Hopf algebras are simple.

MSC:
16T05 Hopf algebras and their applications
16G30 Representations of orders, lattices, algebras over commutative rings

Full Text: DOI