

INSALATE DI MATEMATICA

presents

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*Non-existence of integral Hopf orders
for twists of several simple groups of Lie type*



Abstract:

In 1975 Kaplansky listed 10 conjectures on Hopf algebras, which have been the focus of a great deal of research. Some of these conjectures are still unanswered. In particular, we will be interested on the sixth one, that is a generalization of Frobenius theorem in the framework of representation theory for Hopf algebras. It states that, given a complex finite-dimensional semisimple Hopf algebra H , the dimension of every irreducible representation of H divides the dimension of H . Larson proved a weaker version of it: if the complex finite-dimensional semisimple Hopf algebra admits a Hopf order over a number ring, then Kaplansky' sixth conjecture is satisfied. A natural question now arises: does every complex semisimple finite-dimensional Hopf algebra which satisfies Kaplansky' sixth conjecture admit a Hopf order over a number ring? The answer is negative. In this talk, after a brief excursus on Hopf algebras, we present families of Hopf algebras which satisfy Kaplansky' sixth conjecture, but they do not admit a Hopf order over a number ring. These Hopf algebras are constructed as Drinfel'd twist of the group algebras KG , with K a number field. We will prove that, for every finite simple group G , there is always a deformation such that the twisted Hopf algebra does not admit a Hopf order over a number ring. Moreover, we will show that for two families of groups this non-existence result holds for any twist. This talk is based on a joint work with Giovanna Carnovale and Juan Cuadra.

Keywords: Hopf algebras · Hopf orders · Drinfel'd twist

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"Obvious" is the most dangerous word in mathematics.
(Eric Temple Bell)