

Bilinear Forms, Eilenberg-MacLane Cocycles, and the Central Charge

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In joint work with Yongchang Zhu, we recently established that for a semisimple factorizable Hopf algebra, the value of an integral on the Drinfel'd element and the value of this integral on the inverse Drinfel'd element differ only by a fourth root of unity. If the dimension is odd, they only differ by a sign, and this sign is a plus sign if the dimension is one modulo four, but a minus sign if the dimension is three modulo four.

We conjecture that these two integral values always differ only by a sign, even if the dimension is not odd. However, as we explain in the talk, the analogous result for quasi-Hopf algebras is false. This can be seen in a class of quasi-Hopf algebras that are constructed from so-called Eilenberg-MacLane cocycles. If these quasi-Hopf algebras are ordinary Hopf algebras, these Eilenberg-MacLane cocycles are simply bilinear forms. In this case, the conjecture is in fact correct, as we also explain in the talk.