

Homological properties of braided Hopf algebras

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The global dimension is an important homological invariant of an algebra, often serving as a good analogue of the dimension of a smooth affine algebraic variety. However, there are examples where the global dimension does not align with geometric intuition. This often leads to consider the Hochschild cohomological dimension rather than the global dimension. It is thus a natural question to determine classes of algebras for which the global dimension and the Hochschild cohomological dimension coincide, and this is a well-known fact when our algebra is graded connected or is a Hopf algebra.

In this talk, I will discuss several properties of braided Hopf algebras and explain a result showing that the equality between global and Hochschild dimensions still holds for a braided Hopf algebra in the category of comodules over a cosemisimple coquasitriangular Hopf algebra. I will then examine finer homological properties of braided Hopf algebras, such as smoothness and the twisted Calabi–Yau property. Finally, I will show that under a suitable criterion, a braided Hopf algebra in a comodule category is twisted Calabi–Yau (without assuming cosemisimplicity). The example of the two-parameter braided quantum SL_2 will be presented in detail.

This presentation is based on joint work with Julien Bichon.

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