

# Derived invariance of operations in Hochschild theory

The Hochschild (co)homology theory for associative algebras projective over a commutative ring  $k$  have a rich structure. Namely, the cup and the cap products, the Gerstenhaber bracket and Connes differential, this is summarized as differential calculus or Tamarkin-Tsygan calculus. There are interesting connections of this theory with derived categories: for instance, D. Happel proved the derived invariance of the cup product. Later on, B. Keller showed the derived invariance of the Gerstenhaber bracket. First I will extend the derived invariance of the cup product to allow coefficients in an arbitrary bimodule. Then I will present two proofs of the derived invariance of the cap product, one of them is a joint work with B. Keller [1]. They will be part of my thesis, prepared under the direction of C. Cibils (IMAG UM Montpellier) and J.A. de la Pena (CIMAT México).

As a main tool, I will provide interpretations of these operations merely in terms of derived categories, through a canonical morphism between the Hochschild homology and the  $k$ -dual of Hochschild cohomology with coefficients in the  $k$ -dual of the algebra. Finally I will present related results concerning the Batalin-Vilkovisky structure on Hochschild cohomology.

## Summary

These are the results obtained so far in my doctoral thesis. Together with a joint work with B. Keller.

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