Hochschild homology and Grothendieck Duality

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(This is joint work with A. Jeremías and J. Lipman)

A basic feature of Grothendieck duality is a map of complexes called the fundamental class. It expresses the relationship of duality with differentials and allows the definition of a cycle class in Hodge homology. In the case of a singular variety over a perfect field relates the usual n-forms with the dualizing sheaf. The most general instance of this map is a morphism in the derived category from the Hochschild complex to the relative dualizing complex. Such a map is defined for a separated flat map of noetherian schemes, therefore makes sense in the context of varieties with singularities.

We will develop a generalization of Hochschild homology for schemes in the framework of bivariant theories of Fulton-McPherson. We will show how to obtain the cohomology-homology groups and its basic operations. It will turn out that the fundamental class is an orientation for this theory.