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HIGHER HOCHSCHILD HOMOLOGY AND EXPONENTIAL FUNCTORS

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ABSTRACT. — We study higher Hochschild homology evaluated on wedges of circles, viewed as a functor on the category of free groups. The main results use coefficients arising from square-zero extensions; this is motivated by work of Turchin and Willwacher in relation to hairy graph cohomology.

The functorial point of view allows us to exploit tools such as the theory of polynomial functors and exponential functors. We also introduce and make essential use of the category of outer functors, the full subcategory of functors on free groups on which inner automorphisms act trivially.

We give a description of higher Hochschild homology in terms of intrinsically defined polynomial outer functors; we also obtain several explicit computations of these outer functors, working over a field of characteristic zero. In particular, higher Hochschild homology gives a natural source of non-trivial polynomial outer functors.

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