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Lauren Grimley, Cris Negron, Van C Nguyen and Sarah Witherspoon*

(sjw@math.tamu.edu). *The graded Lie structure of Hochschild cohomology*. Preliminary report.

The Hochschild cohomology of an algebra is a graded commutative algebra that encodes important information about the algebra and its representations. Its graded Lie structure is less well-known and harder to compute than is its associative algebra structure. This computational difficulty stems from its resistance to definition on complexes other than the bar complex where it was historically defined. Schwede gave an elegant topological definition of Lie brackets on Hochschild cohomology as loops on categories of extensions, yet this also has resisted an algebraic interpretation suitable for computational purposes. We present an alternative algebraic approach, defining the Lie bracket on choices of resolutions satisfying some properties, which for example Koszul resolutions of Koszul algebras do satisfy. We illustrate this approach on examples. (Received September 18, 2015)