

Hochschild Cohomology of Twisted Tensor Product Algebras

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Definition

The *Hochschild cohomology* of a k algebra A is $HH^*(A) = \text{Ext}_{A^e}^*(A, A)$.

Definition (Čap, Schichl, Vanžura)

The *twisted tensor product* $A \otimes_{\tau} B$ of A and B via $\tau : B \otimes A \longrightarrow A \otimes B$ is $A \otimes B$ with multiplication $m_{\tau} = (m_A \otimes m_B) \circ (1 \otimes \tau \otimes 1)$.

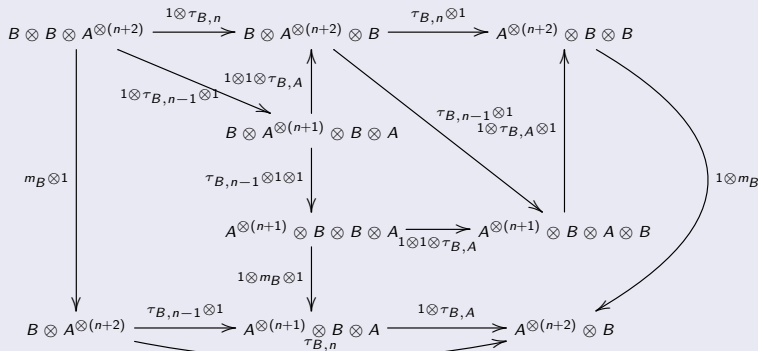
Goal

Understand $HH^*(A \otimes_{\tau} B)$ in terms of $HH^*(A)$ and $HH^*(B)$.

Given a resolution of A as A^e module, and a resolution of B as B^e module, we compute a resolution of $A \otimes_{\tau} B$ as $(A \otimes_{\tau} B)^e$ module. We will need these resolutions to be *compatible* with τ . (Shepler, Witherspoon)

Techniques and Results

Technique(s): fancy diagram chasing



Applications (Grimley, Negron, Nguyen, Shirikov, Witherspoon)

For some $q \in k^*$, $k \langle x, y \rangle / (x^2, y^2, xy + qyx)$, and $k \langle x, y \rangle / (xy - yx - y^2)$.