

Noncommutative Poisson structures, Hochschild type complexes and Gröbner bases theory

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I will discuss Calabi-Yau type conditions, such as pre-Calabi-Yau and exact Calabi-Yau. We show that pre-Calabi-Yau structures give rise to double Poisson brackets of Van den Bergh. The homological formulation of pre-Calabi-Yau structure can be dealt with using Gröbner bases theory to prove purity in case of free graph path algebras.

This technique is common for our study of such exact Calabi-Yau algebras as 3-Sklyanin. Here we are able, for example, to improve the statement in Artin-Schelter classical paper, based on arguments of topological nature, that there is a finite group action on Sklyanin algebras $S_{p,q}$, for which the orbits are exactly isomorphism classes. We can say that this group is $SL_2(\mathbb{Z}_3)$.