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ABSTRACT

Some Intermediate Hopf-Galois Extensions in the Derived Setting

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For an $n+1$-fold loop space X and R a ring object in a suitable infinite category (e.g. E_n-monoidal DGAs or ring spectra) or one can define an X-action on R to be a functor from the classifying space BX (thought of as a category) to the classifying space of the space of automorphisms of R, $BGL_1(R)$. In certain cases familiar from algebraic topology, the quotient object R/X will be a derived BX-Hopf-Galois extension of R. Or, in other language, we can think of R/X as a BX quantum principle bundle over R. We will see that if X is the base space in a fiber sequence of n-fold loop spaces with fiber F and base $B = X/F$ then we have an intermediate derived Hopf-Galois extension $R \to R/F \to R/X$ where the Hopf-algebra of the latter extension is $B = X/F$. If we think of the given fiber sequence as describing F as a sub-bialgebra of X with quotient B, this theorem can be interpreted as one direction of a Galois correspondence for derived Hopf-Galois extensions. Unfortunately, all of our examples arise in algebraic topology, so we would be happy to discuss examples arising in (derived) noncommutative algebra.

Simple modules and their essential extensions for skew polynomial algebras

Ken Brown

University of Glasgow, UK

I will explain the background and known results regarding the following question. Let k be a field, R a commutative affine k-algebra, α

an algebra automorphism of R and $S = R[\theta; \alpha]$ the skew polynomial algebra. When is it the case that every essential extension of a simple S-module is artinian? This question remains open in general - it reduces to apparently delicate questions having a dynamical systems flavour, about the orbits of α in the variety defined by R. This is joint work with Paula Carvalho (Porto) and Jurek Matczuk (Warsaw).

The Dixmier-Moeglin Equivalence

Ken Goodearl

University of California, Santa Barbara, USA

The Dixmier-Moeglin Equivalence asserts that two conditions on a prime ideal P, one algebraic and one topological, are equivalent to P being primitive. We will discuss the formulation of the DME, the number of cases in which it holds, and the paucity of cases in which it fails.

Comodule of Kähler forms

Xiaoshan Qin

Fudan University, China

Given a cocommutatve coalgebra, there exists the comodule of Kähler forms. In this talk, we will establish the relation between the comodule of Kähler forms and skew-cosymmetric multi-coderivations, and introduce some properties of skew-cosymmetric multi-coderivations.

Discriminant and its applications

Yanhua Wang

Shanghai University of Finance and Economics, China

In this talk, I will introduce the development of discriminant of noncommutative algebras in recent years. Discriminant formulas of some noncommutative algebras will be given. Applications of discriminant in automorphism group, isomorphism problem and Zariski cancellation

problem will be presented. This is a joint work with S. Ceken, J. H. Palimeri and J.J. Zhang.

Frobenius-Perron Theory of Endofunctors

Elizabeth Wicks

University of Washington, USA

We introduce a generalization of Frobenius-Perron dimension to an arbitrary k-linear category with an endofunctor. We apply this theory to some derived categories and categories of representations of finite dimensional algebras.

1-, (∞,1)- and 2-linear algebra and Hochschild theory

Liang Ze Wong

University of Washington, USA

The category of modules over a ring is a 1-categorical analogue of the free vector space over a set. In this largely speculative talk, I attempt to make this analogy precise, and see what concepts of linear algebra can be incorporated in representation theory. We see that the trace is about the only invariant we can readily define, and this corresponds to zeroth Hochschild homology. Applying this to the n-Kronecker quivers, which have very different representation types despite all having the same trace, we see that the category of modules behaves more like a lattice than a vector space. I end by briefly mentioning some extensions to $(\infty, 1)$- and 2-categorical linear algebra, and survey some new phenomena that arise in these settings.

An introduction to derivators

John Zhang

University of California, Los Angeles, USA

Derivators are an important compromise notion between model categories and quasicategories. An important sub-class of derivators are the *strong stable* derivators, which are enhancements of triangulated

categories. We will discuss the basic theory of derivators and discuss the benefits of using derivators in lieu of model categories or triangulated categories.