

SNAD III

August 8, 2015

ABSTRACT

Duality pairs induced by Gorenstein projective modules

Nanqing Ding

Nanjing University, China

Let C be a semidualizing module over a commutative Noetherian ring R . We investigate duality pairs induced by C -Gorenstein projective modules. It is proven that R is Artinian if and only if $(\mathcal{GP}_C, \mathcal{GI}_C)$ is a duality pair if and only if $(\mathcal{GI}_C, \mathcal{GP}_C)$ is a duality pair and $M^+ \in \mathcal{GI}_C$ whenever $M \in \mathcal{GP}_C$, where \mathcal{GP}_C (\mathcal{GI}_C) is the class of C -Gorenstein projective (C -Gorenstein injective) R -modules. In particular, we give a necessary and sufficient condition for a commutative Artinian ring to be virtually Gorenstein. Moreover, we get that R is Artinian if and only if the class \mathcal{GP} of Gorenstein projective R -modules is preenveloping. As applications, some new criteria for a semidualizing module to be dualizing are given provided that R is a commutative Artinian ring. This talk is a report on joint work with Y. Geng and J. Hu.

An update on the finitistic dimension conjectures

Birge Huisgen-Zimmermann

University of California, Santa Barbara, USA

We recall the finitistic dimension conjectures and their relevance in the theory of finite dimensional algebras. Then we discuss old and new results addressing these conjectures, with emphasis on those obtained in the present millennium.

Quantum Cluster Algebra Structures in Quantized Coordinate Rings

Ken Goodearl

University of California, Santa Barbara, USA

This talk will focus on the concept of quantum cluster algebras and the appearance of these structures in large families of quantized coordinate rings. The latter algebras are iterated skew polynomial algebras (or localizations thereof) which are noncommutative unique factorization domains, and their quantum cluster structures arise from quasi-commuting families of prime elements. This is joint work with Milen Yakimov.

Dual Reflection Groups

Ellen Kirkman

Wake Forest University, USA

Let A be an Artin-Schelter regular algebra that is graded by a finite group G . We call G a dual reflection group for A if the identity component A_e of A is also AS regular. We consider necessary conditions on (G, A) for G to be a dual reflection group for A , and we give a construction of some dual reflection groups. The associated Hopf algebra $H = k^G$ of a dual reflection group can be regarded as a generalization of a reflection group since the invariant subring $A^H = A_e$ is AS regular, providing a generalization of the Shephard-Todd-Chevalley Theorem.

Homomorphisms from the enveloping algebra of the positive Witt algebra

Chelsea Walton

Temple University, USA

Take U to be the universal enveloping algebra of either the Virasoro algebra, the Witt algebra, or the positive part of the Witt algebra. We produce homomorphisms from U to Artin-Schelter regular algebras; kernels and homomorphic images of these maps are analyzed. As a result, we produce an elementary proof that U is neither left nor right Noetherian. This is joint work in preparation with Sue Sierra.

On Quantum groups associated to non-noetherian regular algebras of dimension 2

Xingting Wang

Temple University, USA

It has been long suspected that the universal quantum linear groups that coact on an associated algebra R possess the same homological and ring-theoretic properties of R itself. In this talk, we investigate the case when universal quantum linear groups coact on Artin-Schelter regular algebras of global dimension 2, especially with central homological codeterminant (or central quantum determinant). In the case when the homological codeterminant of the coaction is trivial, we show that the quantum group of interest, defined independently by Manin and by Dubois-Violette and Launer, is Artin-Schelter regular of global dimension 3 and also skew Calabi-Yau (homologically smooth of dimension 3). For central homological codeterminant, we verify that the quantum groups are Noetherian and have finite Gelfand-Kirillov dimension precisely when the corresponding comodule algebra satisfies these properties. We have similar results for arbitrary homological codeterminant if we require that the quantum groups are involutory. We also establish conditions when Hopf quotients of these quantum groups are cocommutative. Joint work with Chelsea Walton.