Ten-minute talks

June 21, 2022

SCHEDULE

Time: 9:35-9:45 am
Speaker: Lucas Buzaglo, University of Edinburgh
Title: Universal enveloping algebras of Krichever-Novikov algebras

Time: 9:45-9:55 am
Speaker: Kent Vashaw, MIT
Title: Balmer spectra and Drinfeld centers

Time: 10:30-10:40 am
Speaker: Zahra Nazemian, University of Graz
Title: Noetherian rings with Auslander dualizing complex are bounded factorization

Time: 10:40-10:50 am
Speaker: Dillon Hanson, University of North Texas
Title: Invariant Mixed Forms of Modular Reflection Groups

Time: 3:00-3:10 pm
Speaker: Pablo Ocal, UCLA
Title: Towards a Support Theory for Relative Hochschild Cohomology

Time: 3:10-3:20 pm
Speaker: Colin Lawson, University of North Texas
Title: Deformation Cohomology for Cyclic Group Actions

Time: 3:35-3:45 pm
Speaker: Be'eri Greenfeld, UCSD
Title: Gaps and approximations in the space of growth functions

Time: 3:45-3:55 pm
Speaker: Hongdi Huang, Rice University
Title: Universal Quantum Semigroupoids

ABSTRACT

Universal enveloping algebras of Krichever-Novikov algebras

Lucas Buzaglo

University of Edinburgh

Universal enveloping algebras of finite-dimensional Lie algebras are fundamental examples of well-behaved noncommutative rings. On the other hand, enveloping algebras of infinite-dimensional Lie algebras remain mysterious. For example, it is widely believed that they are never noetherian, but there are very few examples whose noetherianity is known. In this talk, I will introduce a class of infinite-dimensional Lie algebras known as Krichever-Novikov algebras and talk about a recent proof that their enveloping algebras are not noetherian, providing a new family of non-noetherian universal enveloping algebras.

Balmer spectra and Drinfeld centers

Kent Vashaw

MIT

The Balmer spectrum of a monoidal triangulated category is an important geometric construction which is closely related to the problem of classifying thick tensor ideals. We prove that the forgetful functor associated to the Drinfeld center of a finite tensor category induces a continuous map between the Balmer spectra of corresponding stable categories. In the finite-dimensional Hopf algebra setting, we give conditions under which it is injective, surjective, or a homeomorphism. We apply this general theory to prove that Balmer spectra associated to finite-dimensional cosemisimple quasitriangular Hopf algebras coincide with the Balmer spectra associated to their Drinfeld doubles, and that the thick ideals of both categories are in bijection. An analogous theorem is proven for certain Benson-Witherspoon smash coproduct Hopf algebras, which are not quasitriangular in general.

Noetherian rings with Auslander dualizing complex are bounded factorization

Zahra Nazemian

University of Graz

Beside several techniques to find examples of noetherian domains with bounded factorization (BF) property, we see that noetherian domains possessing a particular finite partitive function from finitely generated modules to a set of ordinal numbers are *BF*. This implies that noetherian rings with Auslander dualizing complex are BF. Some examples of these rings are all known noetherian Hopf algebra (including the group ring kG, where k is a field and G is a polycyclic-by-finite group) and Weyl algebras $A_n(k)$, where k is field of characteristic zero. This is selected from a section of a preprint joint with J. Bell, K. Brown and D. Smertnig.

Invariant Mixed Forms of Modular Reflection Groups

Dillon Hanson

University of North Texas

We consider the action of a finite reflection group acting linearly on a vector space of arbitrary characteristic. This action is extended to the set of mixed forms; these are derivations whose coefficients are differential forms rather than polynomials. An analogue of Saito's freeness criterion for invariant mixed forms distinguishes the modular case, when the characteristic of the field divides the order of the group, i.e., when the group contains transvections. We provide the structure for the invariant mixed forms for a class of groups which includes the special linear groups and general linear groups over finite fields.

Towards a Support Theory for Relative Hochschild Cohomology

Pablo Ocal

UCLA

TBA.

Deformation Cohomology for Cyclic Group Actions

Colin Lawson

University of North Texas

The Hochschild cohomology of an algebra records information about the deformations of the algebra. In this talk, we will highlight the Hochschild cohomology governing the graded deformations of skew group algebras for cyclic groups acting on polynomial rings. For skew group algebras, a description of the Hochschild cohomology is known in the nonmodular setting (i.e. when the characteristic of the field and the order of the group are coprime), but much less is know in the modular setting (i.e. when the characteristic of the field divides the order of the group).

Gaps and approximations in the space of growth functions

Beeri Greenfeld

UCSD

We present positive and negative results on the space of growth rates of finitely generated algebras. The growth of any (finitely generated, infinite-dimensional) algebra is an increasing and submultiplicative function, so these are the 'natural candidates' for growth rates of algebras. Except for Bergman's gap theorem, no other gap was known for such functions. While any natural candidate is indeed realizable, up to a linear error term, as the growth of an algebra, we prove the existence of arbitrarily rapid natural candidates which are not equivalent to the growth of any algebra, resolving a question of Alahmadi-Alsulami-Jain-Zelmanov.

Universal Quantum Semigroupoids

Hongdi Huang

Rice University

In this talk, we introduce the concept of a universal quantum semigroupoid (UQSGd), which is a weak bialgebra that coacts on a (not necessarily connected) graded algebra A universally while preserving grading. This is a generalized version of universal quantum semigroups introduced by Manin in 1988. We proved that if A is the path algebra $\Bbbk Q$ of a finite quiver Q, then each of the various UQSGds introduced here is isomorphic to the face algebra attached to Q.