Book of Abstracts
XXV Brazilian Algebra Meeting

State University Campinas, December 3 - 7, 2018

Session: Representations of Algebras
Room 125 IMECC

	December 4th	December 5th
14h00 - 14h40:	Marcos	Bekkert
14h50 - 15h20:	Dias da Silva	Wagner
15h30 - 16h00:	Gatica	Lanzilotta
16h00 - 16h30:	Coffee Break	Coffee Break
16h30 - 17h10:	Iusenko	MacQuarrie
17h20 - 17h50:	Alves	

Geometric meaning of Euler quadratic form associated with finite poset.

Kostiantyn Iusenko (University of São Paulo - Brazil)

Abstract:
The importance of integral bilinear forms and integral quadratic forms for classification problems of representations of posets and quivers was first observed in the works of Gabriel and Drozd. For instance, the Tits quadratic form associated with a finite quiver has both geometric and homological interpretations. An important role for applications in representation theory of posets is played by the Tits quadratic form and the Euler quadratic form. The Tits quadratic form associated with a poset is known to have both geometric and homological interpretations. Also it is well-known that Euler form associated with a poset has a homological interpretation. For a finite poset we calculate the dimension of

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the variety of its subspace representations having fixed dimension vector. The dimension is given in terms of the Euler quadratic form associated with a partially ordered set, which gives a geometric interpretation of this form. Several consequences of this result will be discussed. (Based on joint work with Claudia Fonseca).

Hochschild-Mitchell (co)-Homology of G-k-categories overa ring, Galois Coverings and Skew Categories.

Eduardo do Nascimento Marcos (University of São Paulo, Brazil)

Abstract:
Let $\mathcal{C}$ be category, over commutative ring k, provided with an action of a group G. Its Hochschild-Mitchell homology and cohomology are denoted by $HH_*(\mathcal{C})$ and $HH^*(\mathcal{C})$. Let $\mathcal{C}[G]$ be the skewcategory. If the action of G is free on the objects of $\mathcal{C}$, and if the coinvariants and invariants functor are exact, we obtain isomorphisms $HH_*(\mathcal{C})_G \cong HH_*^{\{1\}}(\mathcal{C}[G])$ and $[HH(\mathcal{C})]^G \cong HH^*_{\{1\}}(\mathcal{C}[G])$, where $\{1\}$ is the trivial conjugacy class of G. Using an auxiliary category MGC we show that these isomorphisms also holds if the action in not free, in particular they hold for Hochschild (co)homology of a k-algebra provided with an action of G by automorphisms. Hence $HH_*(\mathcal{C})^G$ is a canonical direct summand of $HH^*(\mathcal{C}[G])$, a fact which provides a frame for monomorphisms obtained by Marcos, Martinez and Martins, and described in low degrees by Green, Hunton and Snashall.

Hochschild cohomology groups of trivial extensions of PHI algebras.

Maria Andrea Gatica (Universidad Nacional del Sur, Argentina)

Abstract:
Given a finite poset $(\Delta, \preceq)$ and an algebraic closed field k, let $A = k\Delta$ be a PHI algebra. Consider the trivial extension algebra $T(A) = A \times D(A)$ of A by the A-bimodule $D(A) = \operatorname{Hom}_k(A, k)$, that is, $T(A) = A \oplus D(A)$ as k-vector space and the multiplication in $T(A)$ is given by $(a, f)(b, g) = (ab, ag + fb)$ for $a, b \in A$ and f,g $\in D(A)$.

The purpose of this talk is to describe the relation between the Hochschild cohomology groups of a PHI algebra A with coefficients in the regular bimodule ${}_A A_A$, and that of its trivial extension $T(A)$ of A.

A generalisation of Igusa - Todorov functions

Marcelo Lanzilotta (Universidad de la República - Uruguay)

Abstract:
In this talk I will propose a generalisation of I-T functions for Artin algebras. This is motivated by the fact that the functions ψ and ϕ depend on the class of the projectives, so it is valid to ask what happens when we take a class of modules that contains the projectives and that allow to define new functions in an analogous way. I will explain the definition of such functions, their fundamental properties and, most importantly, their relation to the original functions.

Quadratic algebras and derived equivalences
Diego Marques (Federal University of Minas Gerais - Brazil)

Abstract:
We use generalized Koszul comlexes to obtain explicit derived equivalences between a gradable quadratic algebra and its quadratic dual.

On linearly oriented pullback of finite dimensional algebras
Heily Wagner (Federal University of Paraná - Brazil)

Abstract:

Given two epimorphisms of algebras $f \colon A \to B$ and $g \colon C \to B$ the pullback R is the subalgebra of $A \times C$ defined by $\{(a,c) \in A \times C \mid f(a) = g(c)\}$. For finite dimensional k-algebras (k an algebraically closed field), which can be determined by bounded quivers, the quiver ordinary of the pullback R can be determined by those of A, B and C. Here we consider a particular class, the so-called linearly oriented pullback, where the injective and projective R-modules can be determined by those ones over A and C. For this class of pullbacks, we study the relationship between the category of modules over the involved algebras.

The Malcev Uniqueness Theorem for pseudocompact algebras
John William MacQuarrie (Federal University of Minas Gerais - Brazil)

Abstract:

The famous Wedderburn-Malcev Theorem for finite dimensional algebras has been extended in several ways. The "Wedderburn part" – existence of a continuous splitting of

the algebra homomorphism $A \to A/J(A)$ – has been extended to pseudocompact algebras (under the same conditions as for finite dimensional algebras). However, the useful "Malcev part" – unicity of the splitting up to conjugacy – has not. By studying semisimple and separable pseudocompact algebras, I present a proof of the Malcev uniqueness theorem for pseudocompact algebras. Joint work with Mark Kleiner (Syracuse) and Kostiantyn Iusenko (USP).

Posters Representations of Algebras

t-structures in derived categories

Cleber Barreto (Federal University of Paraná - Brazil)

Abstract:

In the last years, tilting modules have played a fundamental role in the Representation Theory, appearing for instance in the study of the cluster algebras. A tilting module also allows a construction of a new algebra, the algebra of endomorphisms, which can be studied from the initial algebra and from the existence of equivalences between certain full subcategories of the module categories, obtained from torsion pairs. More generally, it is possible to compare the categories of modules over an algebra and over the algebra of endomorphisms of a tilting such that there exists an equivalence between their derived categories. On this sense, one can de ne a new structure which generalises the idea of torsion pairs in abelian categories: the t-structures. Basically, this new concept retrives the information of torsion pairs, expanding its understanding. It is also possible to recover an abelian category from a t-structure by computing its heart. An interesting case is when the heart of a t-structure is precisely a category of modules One of the interesting properties is the compatibility of t-structures. For instance, it allows to obtain some relationship between two abelian categories which have equivalent derived categories. Another advantage of the study of compatibility is to decide if a certain algebra is piecewise hereditary. A part of our work is study a possible compatibility obtained from a hereditary algebra by processes named tilting. In particular, we are interested in how the homology associated to this t-structures can be used to study the case of compatibility. In this way, our work is based on seeking of necessary and su cient criteria for decide when a pair of t-structures constructed one by another for tilting process is compatible, through homological characteristics of two t-structures.

Teorema de estrutura para módulos sobre domínios

Marcel Thadeu de Abreu e Souza (Federal University of Paraná - Brazil)

Abstract:

Neste trabalho apresentaremos o teorema dos divisores elementares, que conclui que todo módulo finitamente gerado sobre um domínio principal pode ser expresso como soma direta de cópias do anel e quocientes da forma $\frac{A}{p_i^{r_{ij}}A}$. Mais precisamente, para um módulo M finitamente gerado sobre um domínio principal A, existem um inteiro $n \geq 0$, elementos irredutíveis $p_1, ..., p_s \in A$ e inteiros:

$$r_{11} \geq r_{12} \geq ... \geq r_{1t_1} > 0$$

$$\vdots$$

$$r_{s1} \geq r_{s2} \geq ... \geq r_{st_s} > 0$$

tais que:

$$M \cong A^{(n)} \oplus \frac{A}{p_1^{r_{11}}A} \oplus ... \oplus \frac{A}{p_1^{r_{1t_1}}A} \oplus ... \oplus \frac{A}{p_s^{r_{s1}}A} \oplus ... \oplus \frac{A}{p_s^{r_{st_s}}A},$$

onde os inteiros n, r_{ij}, $1 \leq j \leq t_i$, $1 \leq i \leq s$, e os ideais $p_i^{r_{ij}}A$ estão univocamente determinados pelas condições acima. Com o objetivo de demonstrar tal teorema, introduziremos conceitos preliminares da teoria de módulos.

Posteriormente, mostraremos uma aplicação deste teorema na teoria de grupos, mais especificamente na classificação dos grupos abelianos finitamente gerados.

Stratification Analysis of Certain Nakayama Algebras

Rafael Francisco Ochoa de la Cruz (Universidad Nacional Autonoma de Mexico - Mexico)

Abstract:

Our purpose in these poster is to present a result for a specific Nakayama Algebra. In essence, it affirms that for any order of simple modules, the cyclic Nakayama Algebras with relations $rad^r(KQ) = 0$ are not standardly stratified or costandardly stratified.

Categorical approach to path (co)-algebra constructions.

Samuel Amador dos Santos Quirino (University of São Paulo - Brazil)

Abstract:

We show that the path (co)algebra and Gabriel quiver constructions can be defined functorially for suitable categories. Moreover, they form a pair of adjoint functors under a relation on (co)algebra homomorphisms.

On the Uniqueness of the Auslander-Reiten sequences
Viktor Chust Bugno Pires de Almeida (University of São Paulo - Brazil)

Abstract:
The area of Representations of Algebras has greatly developed in the last decades, mainly due to the introduction of the concept of almost split sequences by M. Auslander and I. Reiten in the 70's. These almost split sequences are also known as Auslander-Reiten sequences. For example, the study of these sequences originated a new proof of the First Brauer-Thrall conjecture.

Our purpose here is to present a basic, although important result about the almost split sequences , which are a special kind of short exact sequences of modules with indecomposable end terms. The result establishes that, given a module over an algebra, if there is an almost split sequence starting with (or ending with) this module, it will be unique up to isomorphism.

TBA
Wesley dos Santos Villela Batista (Federal University of Paraná - Brazil)