

2013 长江三角洲地区代数学术会议

同前两次一样，长江三角洲地区代数学术会议的目的主要是为江苏、浙江、安徽、上海四地的代数学者、研究生和青年研究人员提供一个交流机会、研讨相关研究领域的最新进展和动向，促进彼此之间的相互了解和合作。2013 年度长江三角洲地区代数学术会议定于 2013 年 12 月 6-8 日在复旦大学举办。会议得到复旦大学资助。

会议邀请报告人：

Huixiang Chen	(陈惠香)	扬州大学
Xiaowu Chen	(陈小伍)	中科大
Nanqing Ding	(丁南庆)	南京大学
Jiwei He	(何济位)	绍兴文理学院
Naihong Hu	(胡乃红)	华东师大
Zhaoyong Huang	(黄兆泳)	南京大学
Fang Li	(李方)	浙江大学
Libin Li	(李立斌)	扬州大学
Gongxiang Liu	(刘公祥)	南京大学
Diming Lu	(卢涤明)	浙江大学
Hourong Qin	(秦厚荣)	南京大学
Jiaqun Wei	(魏加群)	南京师大
Honglian Zhang	(张红莲)	上海大学
Ruibin Zhang	(张瑞斌)	中科大，悉尼大学
Pu Zhang	(章璞)	上海交大
Guodong Zhou	(周国栋)	华东师大

会议时间：

2013 年 12 月 6 日下午 2 点 30 分—12 月 8 日下午 4 点

会议时间地点：

复旦大学(邯郸路 220 号)光华东主楼 2001 室

会议用餐安排：

早餐：7:00 — 8:00 复旦大学燕园宾馆（政通路 270 号）

午餐：12:10 — 13:00 复旦大学教授餐厅（旦苑餐厅三楼）（工作午餐）

晚餐：12 月 6 日 18:00 复旦大学燕园宾馆

12 月 7 日 18:00 晚宴（地点待定）

PROGRAM

Dec. 6, 2013 (星期五下午)

- 14.30---14.35 Welcome speech
14.35---15.25 章 璞 Gorenstein 亏范畴
15.25---16.15 李立斌 Introduction to representation rings of Hopf algebras
16.15---16.40 Tea break
16.40---17.30 何济位 PBW deformations of Koszul algebras over a nonsemisimple ring

Dec. 7, 2013 (星期六上午)

- 08.30---09.20 秦厚荣 On a conjecture of Mazur concerning anomalous primes
09.20---10.10 黄兆泳 The Higher Auslander-Reiten Theory and Auslander Condition
10.10---10.30 Tea break
10.30---11.20 魏加群 Wakamatsu-tilting modules and complexes
11.20---12.10 刘公祥 Basic quasi-Hopf algebras of tame type

Dec. 7, 2013 (星期六下午)

- 14.00---14.50 陈小伍 On morphisms determined by objects in additive categories
14.50---15.40 周国栋 On the Batalin-Vilkovisky structure over the Hochschild cohomology ring of a Frobenius algebra
15.40---16.00 Tea break
16.00---16.50 张红莲 Two-parameter twisted quantum affine algebras

Dec. 8, 2013 (星期天上午)

- 08.30---09.20 丁南庆 Duality pairs induced by Gorenstein projective modules with respect to semidualizing modules
09.20---10.10 李 方 The Green ring of Nakayama truncated algebras
10.10---10.30 Tea break
10.30---11.20 陈惠香 Representations of Hopf-Ore extensions of group algebras and pointed Hopf algebras of rank one
11.20---12.10 卢涤明 Regularity criterion for a connected graded algebra

Dec. 8, 2013 (星期天下午)

- 14.00---14.50 胡乃红 On some related work of 2-cocycle deformation of quantum groups
14.50---15.40 张瑞斌 First fundamental theorem of invariant theory for quantum supergroups
15.40---16.00 Tea time

ABSTRACT

Representations of Hopf-Ore extensions of group algebras and
pointed Hopf algebras of rank one

Hui-Xiang Chen, Yangzhou University

Abstract: In this paper, we first investigate the ranks of Hopf-Ore extensions of group algebras and the structures of pointed Hopf algebras of rank one. Then we study the representation theory of these Hopf algebras. It is shown that a pointed Hopf algebra of rank one is isomorphic to a quotient of Hopf-Ore extension of its coradical. Let $H = kG(\chi, a, \delta)$ be a Hopf-Ore extension of kG and H' a rank one quotient Hopf algebra of H , where k is a field, G is a group, a is a central element of G and χ is a k -valued character for G with $\chi(a) \neq 1$. We first show that the simple weight modules over H and H' are finite dimensional. Then we describe the structures of all simple weight modules over H and H' , and classify them. We also consider the decomposition of the tensor product of two simple weight modules over H' into the direct sum of indecomposable modules. Furthermore, we describe the structures of finite dimensional indecomposable weight modules over H and H' , and classify them. Finally, when $\chi(a)$ is a primitive n -th root of unity for some $n \geq 2$, we determine all finite dimensional indecomposable projective objects in the category of weight modules over H' .

On morphisms determined by objects in additive categories

Xiao-Wu Chen, USTC

Abstract: We prove that a Hom-finite additive category having determined morphisms on both sides is a dualizing variety. This complements a result by Krause. We prove that in a Hom-finite abelian category having Serre duality, a morphism is right determined by some object if and only if it is an epimorphism. Indeed, we give a characterization to abelian categories having Serre duality via determined morphisms. This work follows closely the one by Krause.

Duality pairs induced by Gorenstein projective modules
with respect to semidualizing modules

Nanqing Ding, Nanjing University

Abstract: 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.

PBW deformations of Koszul algebras over a nonsemisimple ring

Jiwei He, Shaoxing College of Arts and Sciences

Abstract: Let B be a generalized Koszul algebra over a finitely dimensional algebra S . We construct a bimodule Koszul resolution of B when the projective dimension of S_B equals to 2, by which a Poincaré-Birkhoff-Witt (PBW) type theorem is proved for a deformation of a generalized Koszul algebra. When the projective dimension of S_B is larger than 2, we construct bimodule Koszul resolutions for generalized smash product algebras obtained from a braiding between finite dimension algebras and Koszul algebras, and then prove the PBW type theorem. The results obtained are applied to Koszul Artin-Schelter Gorenstein algebras defined over a nonsemisimple algebra. This is a joint work with F. Van Oystaeyen and Y. Zhang.

On some related work of 2-cocycle deformation of quantum groups

Naihong Hu, East China Normal University

Abstract: This is a survey talk based on our some joint work on quantum groups between one-parameter and multiparameter, their 2-cocycle deformations, Isomorphic Theorem, Green rings for some Hopf algebras, and related work.

The Higher Auslander-Reiten Theory and Auslander Condition

Zhaoyong Huang, Nanjing University

Abstract: It is known that the Auslander-Reiten theory is one of the theoretical basis of representation theory of artin algebras. O. Iyama developed in 2007 such a theory from 2-dimensional to higher-dimensional. Since then the higher Auslander-Reiten theory has become a major research subject in representation theory of artin algebras. In this talk, I will give an introduction to the higher Auslander-Reiten theory and summarize some progress on this topic.

The Green ring of Nakayama truncated algebras

Fang Li, Zhejiang University

Abstract: Nakayama truncated algebras can be viewed as a finite dimensional Hopf algebra, by using covering quiver and weight sequence. With this view-point, we investigate a class of Nakayama truncated algebras and obtain the precise characterization of their Green rings.

Introduction to representation rings of Hopf algebras

Libin Li, Yangzhou University

Abstract: Representation rings provide a natural framework for the study of modules over some algebras (such as group algebras, Lie algebras, Hopf algebras and quantum groups), and have been proven useful in the classification of tensor categories and representation theory. In this talk, we will recall a little bit history about

representation ring, and then report some recent results on the representation rings of finite dimensional pointed rank one Hopf algebra of non-nilpotent type.

The results discussed here are mainly from the joint work of Zhihua Wang, Yinhua Zhang.

Basic quasi-Hopf algebras of tame type

Gong-Xiang Liu, Nanjing University

Abstract: The basic quasi-Hopf algebras of tame type are studied. The situation turns out to be much more complicated than Hopf case. This is a joint work with Huang Hua-Lin and Ye Yu.

Regularity criterion for a connected graded algebra

Diming Lu, Zhejiang University

Abstract: We link a connected graded algebra with an appropriate \mathbb{Z}^r -graded algebra for some positive integer $r(> 1)$. By means of Gröbner basis theory, we show it is available for those \mathbb{Z} -graded algebras without \mathbb{Z}^2 -grading on them.

On a conjecture of Mazur concerning anomalous primes

Hourong Qin, Nanjing University

Abstract: Let $D \in \mathbb{Z}$ be an integer which is neither a square nor a cube in $\mathbb{Q}(\sqrt{-3})$, and let E_D be the elliptic curve defined by $y^2 = x^3 + D$. Mazur conjectured that the number of anomalous primes less than N should be given asymptotically by $c'\sqrt{N}/\log N$ (c' is a positive constant), and in particular there should be infinitely many anomalous primes for E_D . We show that the Hardy-Littlewood conjecture implies the Mazur conjecture, except for $D = 80d^6$, where d is a nonzero integer. Conversely, if the Mazur conjecture holds for some D , then the polynomial $12x^2 + 18x + 7$ represents infinitely many primes. All anomalous primes belong to the quadratic progression $q(h) = \frac{1}{4}(1 + 3h^2)$. Assuming the Hardy-Littlewood conjecture, we obtain the density of the anomalous primes in the primes in $q(h)$ for any D . The density is $1/6$ in some cases, as Mazur had conjectured, but it fails to be true for all D . Our results are more general. In fact, we will consider all primes of six types which belong to $q(h)$, not just anomalous primes. We establish density results for all these primes.

Wakamatsu-tilting modules and complexes

Jiaqun Wei, Nanjing Normal University

Abstract: We show there are close relations between Wakamatsu-tilting modules and repetitive equivalences. Then we generalize Wakamatsu-tilting modules to Wakamatsu-tilting complexes (more further to Wakamatsu-tilting complexes). Characterizations of Wakamatsu-tilting complexes are given.

First fundamental theorem of invariant theory for quantum supergroups

Ruibin Zhang, USTC and the University of Sydney

Abstract: Let V be the natural module for U_q , which is either the quantum general linear supergroup or quantum orthosymplectic supergroup. Denote by $\mathcal{T}(V)$ the full subcategory of the category of finite dimensional \mathbb{Z}_2 -graded U_q -modules with objects being tensor powers $V^{\otimes r}$ for all r . We show that there is a full braided tensor functor from the category of ribbon graphs to $\mathcal{T}(V)$, which preserves ribbon category structures. This in particular implies that the endomorphism algebra $\text{End}_{U_q}(V^{\otimes r})$ is a homomorphic image of the Hecke algebra of degree r if U_q is the quantum general linear supergroup, and that of the BMW algebra of degree r with appropriate parameters if U_q is the quantum orthosymplectic supergroup. This is joint work with Gus Lehrer and Hechun Zhang.

Two-parameter twisted quantum affine algebras

Honglian Zhang, Shanghai University

Abstract: In this talk, two-parameter quantum affine algebras for all twisted types are further studied. We give their two realizations: Drinfeld-Jimbo realizations and Drinfeld realizations, and establish the algebra isomorphism between the above two realizations. It is well-known that the Drinfeld-Jimbo realizations admit the Hopf structures naturally, while even for classical non-twisted case, the Hopf structures of Drinfeld realizations have not been described clearly, we define the coproduct of Drinfeld realizations specifically, then obtain their Hopf structures. In particular, the algebra isomorphism is actually a Hopf isomorphism. This talk is based on the joint work with Prof. Naihuan Jing.

Gorenstein 亏范畴

Pu Zhang, Shanghai Jiao Tong University

摘要：在这个报告里，我们将回顾代数三角范畴的一些基本事实。我们将给出Gorenstein 亏范畴的一个新刻画。

On the Batalin-Vilkovisky structure
over the Hochschild cohomology ring of a Frobenius algebra

Guo-dong Zhou, East China Normal University

Abstract: We prove that if the Nakayama automorphism of a Frobenius algebra is diagonalisable, then the Hochschild cohomology ring of this Frobenius algebra is a Batalin-Vilkovisky algebra. This result is analogous to a recent theorem of N. Kowalzig and U.Kraehmer for twisted Calabi-Yau algebras. We shall present some examples including finite dimensional Hopf algebras. This talk is based on a work in progress with Thierry Lambre and Alexander Zimmermann.