代数学研讨会

（2022 年 11 月 7 日）

会 议 日 程

主办单位： 吉林大学 东北师范大学

吉林大学数学学院 东北师范大学数学与统计学院

吉大-东师代数学研讨会日程

2022 年 11 月 7 日（腾讯会议 ID: 935-380-971　会议密码: 2022）			
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9:00-9:30		扶先辉	Lattice theoretic properties of approximating ideals
9:30-10:00		孙晓松	On the LND Conjecture for polynomial algebras
	休息		
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14:30-15:00		唐荣	Homotopy relative Rota-Baxter Lie algebras, triangular L_∞-bialgebras and higher derived brackets
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15:10-15:40	徐晓伟	陈良云	On Hom-Groups and Hom-Rings
15:40-16:10		谭海军	Simple restricted modules over the Heisenberg-Virasoro algebra
16:10-16:50		侯帅	3-post-Lie algebras and relative Rota-Baxter operators of nonzero weight on 3-Lie algebras

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题目和摘要

陈良云 (东北师范大学)

题目：On Hom-Groups and Hom-Rings

摘要：Hom-type algebras began in the 21st century, it is a kind of broader algebraic structure obtained from acting some equations of original algebra by twistwd map. This talk introduces Hom-groups and Hom-rings. Moreover, we propose some objects for the study on Hom-type algebras.

陈银 (东北师范大学)

题目：Relations between some modular invariants

摘要：A conjecture of Bonnafe-Kemper (2011) asserts that the invariant ring corresponding to the general linear group over a finite field acting on the direct sum of the natural representation and its dual is a complete intersection. This conjecture has been confirmed positively by Chen (2014; the case $n = 2$) and Chen-Wehlau (2017; the general case). Fundamental tasks in exploring structure of an invariant ring include (1) find a minimal generating set for the invariant ring; and (2) find all relations between the generators. This talk will give a method to find out all relations between the generators of the invariant ring mentioned above for the case $n = 2$. Some remarks on relations for the general case (that might be helpful to further exploration) also will be presented.

杜现昆 (吉林大学)

题目：Hom-Yang-Baxter方程的集论解

摘要：Yang-Baxter方程及动力Yang-Baxter方程的集论解已经被广泛研究, 特别是Yang-Baxter方程的研究产生了一些新的代数系统, 如cycle set, brace 等. brace的理论以及成为环论的一个新的活跃的研究课题. Hom-Yang-Baxter 方

程的集论解的研究尚有待开展. 我们给出了Hom-Yang-Baxter方程的左非退化的、对合的集论解的刻画, 讨论了其非退化性, 给出了相应的代数系统Hom-cycle set 及其与cycle set的联系. (与张凯强合作)

扶先辉（东北师范大学）

题目： Lattice theoretic properties of approximating ideals

摘要： It is proved that a finite intersection of special preenveloping ideals in an exact category $(A; E)$ is a special preenveloping ideal. Dually, a finite intersection of special precovering ideals is a special precovering ideal. A counterexample of Happel and Unger shows that the analogous statement about special preenveloping subcategories does not hold in classical approximation theory. If the exact category has exact coproducts, resp., exact products, these results extend to intersections of infinite families of special peenveloping, resp., special precovering, ideals. These techniques yield the Bongartz-Eklof-Trlifaj Lemma: if $a : A \to B$ is a morphism in A, then the ideal $a\perp$ is special preenveloping. This is an ideal version of the Eklof-Trlifaj Lemma, but the proof is based on that of Bongartz' Lemma. The main consequence is that the ideal cotorsion pair generated by a small ideal is complete. This is joint work with Ivo Herzog, Jiangsheng Hu and Haiyan Zhu.

侯帅（吉林大学）

题目： 3-post-Lie algebras and relative Rota-Baxter operators of nonzero weight on 3-Lie algebras

摘要： In this talk, we will introduce the notions of relative Rota-Baxter operators of nonzero weight on 3-Lie algebras and 3-post-Lie algebras. A 3-post-Lie algebra consists of a 3-Lie algebra structure and a ternary operation such that some compatibility conditions are satisfied. We show that a relative

Rota-Baxter operator of nonzero weight induces a 3-post-Lie algebra naturally. Conversely, a 3-post-Lie algebra gives rise to a new 3-Lie algebra, which is called the subadjacent 3-Lie algebra, and an action on the original 3-Lie algebra. Then we construct an L_∞-algebra whose Maurer-Cartan elements are relative Rota-Baxter operators of nonzero weight. Consequently, we obtain the twisted L_∞-algebra that controls deformations of a given relative Rota-Baxter operator of nonzero weight on 3-Lie algebras. Finally, we introduce a cohomology theory for a relative Rota-Baxter operator of nonzero weight on 3-Lie algebras and use the second cohomology group to classify infinitesimal deformations.

刘杰锋（东北师范大学）

题目：Conformal r-matrix-Nijenhuis structures, symplectic-Nijenhuis structures and ON-structures

摘要：In this talk, we first study infinitesimal deformations of a Lie conformal algebra with a module (called an LCModP pair), which lead to the notion of Nijenhuis structure on the LCMod pair. Then by adding compatibility conditions between Nijenhuis structures and $\mathcal{O}$-operators, we introduce the notion of an ON-structure on an LCMod pair and show that an ON-structure gives rise to a hierarchy of pairwise compatible $\mathcal{O}$-operators. In particular, we show that compatible $\mathcal{O}$-operators on a Lie conformal algebra can be characterized by Nijenhuis operators on Lie conformal algebras. Finally, we introduce the notions of conformal r-matrix-Nijenhuis structure and symplectic-Nijenhuis structure on Lie conformal algebras and study their relations.

马晶（吉林大学）

题目：A Note on Soft Modules

摘要Some difficulties in economics, engineering, environment, social science, medical science etc., are due to uncertainties and the inadequacy of the theories of parameterization tools. Thus people study fuzzy set and soft set. The study on Soft Modules belongs to the crossing field of soft set and module theory. We investigate the property of essential soft submodule, the socle and the radical of a soft module, soft factor module, soft homomorphisms, and soft exact sequences. Also, examples of these related soft submodules are given.

马瑶（东北师范大学）

题目：Whittaker modules over the super Schrodinger algebra

摘要：In this talk, we will study Whittaker modules over the $N = 1$ super Schrödinger algebra $\mathcal{S}$ in $(1 + 1)$-dimensional spacetime. Firstly, we give the Casimir element and describe the center of $U(\mathcal{S})$, by the localization of $U(\mathcal{S})$ at G. Then we define the Whittaker $\mathcal{S}$-supermodules, and classify the simple Whittaker $\mathcal{S}$-supermodules. In particular, Whittaker modules over $\mathfrak{osp}(1|2)$ are also constructed and classified.

生云鹤（吉林大学）

题目：Cohomologies and deformations of modified r-matrices

摘要：In this talk, we construct the differential graded Lie algebra that controls deformations of a modified r-matrix (a solution of the modified Yang-Baxter equation), and define the cohomology of a modified r-matrix.

孙晓松（吉林大学）

题目：On the LND Conjecture for polynomial algebras

摘要：The LND Conjecture asserts that the images of locally nilpotent derivations of polynomial algebras are Mathieu-Zhao subspaces (a generalization of

ideals). The problem arose from the Jacobian Conjecture in affine algebraic geometry. We solve the LND Conjecture for a large class of locally nilpotent derivations in dimension three using the technique of local slices and integrals.

谭海军（东北师范大学）

题目：Simple restricted modules over the Heisenberg-Virasoro algebra

摘要：In this talk, we will present all simple restricted modules over the mirror Heisenberg-Virasoro algebra D, and the twisted Heisenberg-Virasoro algebra $\bar{D}D$ with nonzero level. A few examples of simple restricted D-modules and $\bar{D}D$-modules induced from simple modules over finite dimensional solvable Lie algebras will be provided. These modules are not tensor product modules of Virasoro modules and Heisenberg modules. This is a joint work with Professor Yao Yufeng and Professor Zhao Kaiming.

唐荣 (吉林大学)

题目：Homotopy relative Rota-Baxter Lie algebras, triangular L_∞-bialgebras and higher derived brackets

摘要：We describe L_∞-algebras governing homotopy relative Rota-Baxter Lie algebras and triangular L_∞-bialgebras, and establish a map between them. Our formulas are based on a functorial approach to Voronov's higher derived brackets construction which is of independent interest.