Groups and Algebras
Groupes et algèbres

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YURI BAHTURIN, Memorial University of Newfoundland
Real graded division algebras

In this joint work with Professor Mikhail Zaicev of Moscow State University, we classify, up to equivalence, all finite-dimensional real graded division algebras. The grading is by any abelian group. The classification in the case where the algebras are simple was previously obtained by us and independently by Adrián Rodrigo-Escudero of University of Zaragoza.

INNA BUMAGINA, Carleton University, Canada

OLGA KHARLAMPOVICH, Hunter College and Graduate Center CUNY
Tarski-type problems for free Lie algebras

We will show that the first order theory of a free Lie algebra over a field of characteristic zero is undecidable. This is a joint result with A. Myasnikov.

DESSISLAVA KOCHLOUKOVA, State University of Campinas (UNICAMP), Brazil
Subdirect sums and fibre sums of Lie algebras

We will discuss subdirect sums and fibre sums of Lie algebras and show that some group theoretic results on subdirect products and fibre products due to Baumslag,Bridson, Roseblade, Howie , Miller and Short have versions for Lie algebras. In particular we will discuss subdirect sums of finitely generated free Lie algebras and will give some sufficient conditions for the the fibre sum of two Lie algebras to be finitely presented in terms of generators and relations (this is a Lie algebra version of the 1-2-3 Theorem from group theory). This is a joint work with Conchita Martínez-Perez (Zaragoza).

ALEXEI KRASSILNIKOV, Universidade de Brasilia
Lie nilpotent asssociative algebras

An associative algebra A is called Lie nilpotent if its associated Lie algebra $A^{(-)}$ (with the Lie bracket defined by $[a, b] = ab - ba$) is nilpotent. Recent interest in Lie nilpotent associative algebras has been motivated by the study of the quotients of the lower central series of $A^{(-)}$ for various associative algebras A. This study was initiated in 2007 in the pioneering work of Feigin and Shoikhet and developed in a number of articles by various authors.

In my talk I will present and discuss some new results about Lie nilpotent associative algebras.

JEREMY MACDONALD, Concordia University

JACOB MOSTOVOY, CINVESTAV-IPN
Multiplicative graphs and related algebras

A multiplicative graph Q is a graph together with an associative morphism of its cartesian square $Q \square Q$ to Q. There are several examples of multiplicative graphs that arise in knot theory; the category of multiplicative graphs whose vertices form a group is equivalent to the category of augmented racks. We show how to construct rack homology via multiplicative graphs and define several Hopf algebras associated with a multiplicative graph.

ALEXEI MYASNIKOV, CUNY, USA

VICTOR PETROGRADSKY, University of Brasilia
Lie identities of symmetric Poisson algebras

We recall results on existence of identical relations in group rings and universal (restricted) enveloping algebras of (restricted) Lie (super)algebras in case of different characteristics.

Now we consider related results on identities in Poisson algebras. Let L be a Lie algebra over a field of characteristic $p > 0$. Consider its symmetric algebra $S(L) = \oplus_{n=0}^{\infty} U_n/U_{n-1}$, which is isomorphic to a polynomial ring. It also has a structure of a Poisson algebra, where the Lie product is traditionally denoted by $\{\ ,\ \}$. This bracket naturally induces the structure of a Poisson algebra on the truncated polynomial ring $\mathbf{s}(L) = S(L)/(x^p \,|\, x \in L)$, which we call a *truncated symmetric Poisson algebra*. We study Lie identical relations of $\mathbf{s}(L)$. Namely, we determine necessary and sufficient conditions for L under which $\mathbf{s}(L)$ is Lie nilpotent, strongly Lie nilpotent, solvable and strongly solvable, where we assume that $p > 2$ to specify the solvability. We compute the strong Lie nilpotency class of $\mathbf{s}(L)$. Also, we prove that the Lie nilpotency class coincides with the strong Lie nilpotency class in case $p > 3$.

Shestakov proved that the symmetric algebra $S(L)$ of an arbitrary Lie algebra L satisfies the identity $\{x, \{y, z\}\} \equiv 0$ if, and only if, L is abelian. We extend this result for the (strong) Lie nilpotency and the (strong) solvability of $S(L)$. We show that the solvability of $\mathbf{s}(L)$ and $S(L)$ in case $\mathrm{char} K = 2$ is different to other characteristics, namely, we construct examples of such algebras which are solvable but not strongly solvable.

EVEGENY PLOTKIN, Bar Ilan University
Word equations and word equations with constants

I will survey some old and recent results on word maps with the focus on word maps with constants. It turns out that a sort of Borel's dominancy theorem for word maps evaluated on simple algebraic groups remains valid for word maps with constants. Other results deal with Borel-type theorem for linear perfect groups. Joint work with N.Gordeev and B.Kunyavskii

NIKOLAY ROMANOVSKI, Syberian Branch of the Russian Academy of Sciences

LIUDMILA SABININA, Universidad Autonoma del Estado de Morelos
On Malcev algebras with the identity $J(x_1x_2...x_n, y, z) = 0$.

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Let $\mathfrak{M}A_n$ be a variety of Malcev algebras with the identity $J(x_1x_2...x_n, y, z) = 0$, $n \in \mathbb{N}$. We study a structure of Malcev algebras from this variety. In particular, a Malcev algebra $A \in \mathfrak{M}A_2$ is a tangent algebra of some smooth left automorphic Moufang loop M. Let us call a variety of smooth Moufang loops with the identity $([...[x_1, x_2], x_3]..., x_k], y, z) = 1$ the variety of k-generalized left automorphic Moufang loops.
We study the correspondence between smooth k-generalized left automorphic Moufang loops and the variety $\mathfrak{M}A_k$ of their tangent algebras. We show that a local smooth k- generalized left automorphic Moufang loop defines a global smooth k-generalized left automorphic Moufang loop. This talk is based on the joint research with M. Rasskazova and R. Carrillo Catalan.

IVAN SHESTAKOV, University of Sao Paulo
A finite representation of Jordan algebras

Let R be an associative algebra. Let $\star : R \to R$ be an involution. We study the following question: when are the Jordan algebras $R^{(+)}$ and $H(R, \star) = \{a \in R \,|\, a^\star = a\}$ finitely presented?

It is a joint work with Efim Zelmanov.

SVETLA VASSILEVA, Champlain College Saint-Lambert

PAVEL ZALESSKII, University of Brasília
The profinite completion of 3-manifold groups

We shall present structural results of the profinite completion $\widehat{G}$ of a 3-manifold group G. Residual properties of G also will be discussed.