UNIVERSITY OF NOVI SAD
FACULTY OF SCIENCE
Department of Mathematics and Informatics

AAA90

The 90th Workshop on General Algebra
90. Arbeitstagung Allgemeine Algebra

ABSTRACTS

Novi Sad, Serbia, June 5-7, 2015

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INVITED TALKS

Increasing the role of the D-basis as an implicational basis of choice in data analysis applications

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The D-basis is an implicational version of representation of a finite lattice via minimal join covers, which was essential tool in developing the theory of free lattices. The first discovery about the D-basis was the ordered directness property, which gave it a competitive edge in processing times, compared to the canonical direct basis. We present the new features of the D-basis, this time in comparison with the Guigues-Duquenne basis, the latter being the traditional target in analysis of tabular data. Our algorithm of the D-basis retrieval from a binary table enables us to deal with the data of considerably larger size, but, more importantly, to shift attention to a different challenge, which is already battled in data mining. Our proposed new measure of relevance, which allows ranking implications with respect to a fixed attribute in the table, could be of value for expansive field of association rules mining.

This is a joint work with J. B. Nation.

Problems on the frontier of commutator theory

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Within universal algebra a precise definition of an abelian/nonabelian dichotomy for algebras and congruences crystallized in the 1970s. The definition was developed into a commutator theory extending that of groups. This tool allows one to import ideas from group theory into other areas, but it has developed beyond that to include original concepts, such as strong abelianness, higher commutator theory and supernilpotence. I will discuss these developments and identify the line between what is known and what is open.

Fraïssé categories and their applications

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Fraïssé classes and their limits are classical and important objects in model theory. It turns out that the key ideas of Roland Fraïssé are of purely category-theoretic nature. This line of study was originated by Droste & Göbel in the early 90s, focused on specific applications in algebra and theoretical computer science.

The concept of a *Fraïssé category* comes as a natural generalization of a Fraïssé class. Forgetting the point-set structures allows us to find completely new examples and recognize some well-known objects as Fraïssé limits.

The purpose of the lecture is to survey recent results on category-theoretic Fraïssé limits, their properties, and new examples coming usually from outside of model theory.

In particular, we shall discuss new game-theoretic approach to Fraïssé limits which leads to simpler proofs of their uniqueness, avoiding the standard back-and-forth argument.

Quasiorder lattices of varieties

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For any algebra $\mathbf{A}$ the set $\mathrm{Quo}(\mathbf{A})$ of compatible quasiorders (reflexive and transitive binary relations) of $\mathbf{A}$ forms a lattice, and the set $\mathrm{Con}(\mathbf{A})$ of congruences forms a sublattice. In this talk we extend the well known connection between the lattice theoretic properties of $\mathrm{Con}(\mathbf{A})$ and the Maltsev conditions satisfied by $\mathbf{A}$ to $\mathrm{Quo}(\mathbf{A})$ in certain cases. In particular, we show that a locally finite variety $\mathcal{V}$ is congruence distributive [modular] if and only if $\mathrm{Quo}(\mathbf{A})$ is distributive [modular] for all $\mathbf{A} \in \mathcal{V}$. This equivalence does not hold for congruence meet-semidistributivity,

however we can show that if $\mathbf{A}$ is a finite algebra in a congruence meet-semidistributive variety, then $\mathrm{Quo}(\mathbf{A})$ does not have a sublattice isomorphic to $\mathbf{M}_3$.

This is joint work with G. Gyenizse.

Computations in direct powers

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The subpower membership problem (SMP) for a fixed finite algebra $\mathbb{A}$ has as input tuples $a_1, \ldots, a_k, b$ in A^n. The question is whether b belongs to the subalgebra of $\mathbb{A}^n$ generated by $a_1, \ldots, a_k$. The complexity of this problem is important for the effectiveness of various approaches to represent constraints in constraint satisfaction problems (CSP).

We present an overview of complexity results of the SMP for different algebras $\mathbb{A}$. In particular we show that the SMP is in P for all algebras of size 2 and in NP for all finite algebras with few subpowers. Further we provide examples for algebras with NP-complete or PSPACE-complete SMP.

This is joint work with A. Bulatov, M. Steindl, and Á. Szendrei.

Chains of subsemigroups

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The length of a subgroup chain in a group is bounded by the logarithm of the group order. This fails for semigroups, but it is perhaps surprising that there is a lower bound for the length of a subsemigroup chain in the full transformation semigroup which is a constant multiple of the

semigroup order. In this talk I will discuss the latter, and some related, results.

This is joint work with P. J. Cameron, M. Gadouleau and Y. Peresse.

CONTRIBUTED SHORT TALKS

On generalized highly potential words

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A class of infinite words called *highly potential words* has been introduced recently and it has been shown that this class presents a good supply of examples and counterexamples regarding various problems on words. One of the most interesting properties of highly potential words is the fact that they are all aperiodic words of finite positive defect, having the set of factors closed under reversal.

In this talk we present a construction that leads to a class of words wider than the class of highly potential words; we call them *generalized highly potential words*. As it turns out, each generalized highly potential words is either periodic or recurrent but not uniformly recurrent, and we present a necessary and sufficient condition (depending on the input parameters) to distinguish these two possibilities. Generalized highly potential words also have the set of factors closed under reversal, their defect is finite, and for many of them the defect is nonzero, that is, this generalized construction keeps interesting properties of original highly potential words.

This is a joint work with B. Bašić, S. Hačko, and D. Mitrović.

Independence of algebras

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In 1955, A. Foster defined two varieties V, W of the same type to be *independent* if there is a binary term $t(x,y)$ such that $V \models t(x,y) \approx x$ and $W \models t(x,y) \approx y$. We give necessary and sufficient conditions for two finite algebras with a Mal'cev term (or, more generally, with an edge term) to generate independent varieties. For example, if $\mathbf{A}$ and $\mathbf{B}$ are finite algebras in a congruence permutable variety such that

$HS(\mathbf{A} \times \mathbf{A}) \cap HS(\mathbf{B} \times \mathbf{B})$ contains only one element algebras, then they generate independent varieties.

This work was supported by the Austrian Science Fund FWF (P24077 and P24285).

Absorption in semigroups and n-ary semigroups

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We investigate the behavior of absorption (a notion in universal algebra recently introduced by Barto and Kozik) in semigroups and n-ary semigroups. While deciding absorption is quite hard in general, we show that in semigroups and n-ary semigroups everything behaves in a much more clear way.

CSP dichotomy for solving systems of equations on 3

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CSPs whose constraints are given by equations over some finite set of finitary functions correspond to standard CSPs whose constraint language is given by the graphs of these functions. Hence their complexity is determined by the polymorphism set of these graphs, i.e. by a certain centraliser clone. Establishing a complexity dichotomy between P and NP-complete for such CSPs on all finite sets is equivalent to proving the CSP dichotomy conjecture. Based upon the description of the lattice of all centraliser clones on a three-element domain by Daniľčenko, 1977–79, we give a complete classification of the corresponding CSPs on 3 into polynomial-time decidable or NP-complete, using recent tractability results by Marković/McKenzie, Barto/Kozik, and Jovanović/Marković/McKenzie/Moore. Thereby, we confirm a particular instance of Bulatovs dichotomy result for relational CSPs on three elements.

This is joint work with M. Hermann (LIX, École Polytechnique) and G. Salzer (TU Wien).

Orthomodular posets can be organized as conditionally residuated structures

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Orthomodular posets are used in the foundations of quantum mechanics. Since every orthomodular poset is in fact an effect algebra, it yields that it can be recognized as a conditionally residuated structure. The question is which additional conditions have to be satisfied in order to get a one-to-one correspondence. Contrary to the case of effect algebras, orthomodular poset satisfies the orthomodular law and a certain condition concerning the orthogonality of its elements. The correspondence will be presented in the paper.

This is a join work with H. Länger (TU Wien).

Some properties of autocommutator subgroups of 2-groups

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The autocommutator subgroup of a group is the subgroup generated by all autocommutators $[g, \alpha]$ of elements of the group with automorphisms of the group. We investigate properties of the autocommutator subgroup of some finite groups, in particular some 2-groups.

The asymptotic number of planar, slim, semimodular lattice diagrams

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A lattice L is *slim* if it is finite and the set of its join-irreducible elements contains no three-element antichain. Slim lattices are *planar*, so they have planar diagrams. A bijection between two planar lattice diagrams is a *similarity map* if it is a lattice isomorphism preserving the left-right order of (upper) covers and that of lower covers of every element. If there is such a map, then the two diagrams are *similar*. We make no distinction between similar diagrams; for example, the five-element nonmodular lattice has exactly two planar diagrams. We prove the existence of a positive constant C such that the number of slim semimodular lattice diagrams of size n is asymptotically $C \cdot 2^n$. We know that

$$0.42 \cdot 10^{-57} \leq C \leq 0.073,$$

and we conjecture that $0.023 \leq C \leq 0.073$.

Existential pebble games with rank

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Existential k-pebble games, $k \geq 2$, are combinatorial games played between two players, called the Spoiler and the Duplicator, on two structures. These games were devised in order to analyze the expressive power of Datalog and related infinitary logics with finitely many variables. As it turns out, existential k-pebble games have tight connections with certain consistency properties which play an important role in identifying tractable classes of constraint satisfaction problems. It is known that, if a structure $\mathbb{A}$ is of bounded width, the complementary problem $\neg CSP(\mathbb{A})$ can be defined in Datalog. However, the existential pebble games fail to capture definability of constraint satisfaction problems for

structures with the ability to count. In this talk, we will discuss a possible approach to overcome this obstacle by modifying the existential k-pebble game by adding the capability to choose the strategy based on the ability to compute the rank of definable matrices (in a certain extension of the least fixed point logic) over a finite field. This is a work in progress.

Quasivariety of pseudo BCI-algebras and its properties

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Pseudo BCI-algebras are a generalization of known pseudo BCK-algebras. There are described some properties of quasivariety of the algebras in the presentation. We define prefilters, filters and ideals of pseudo BCI-algebras. We prove that filters coincide with ideals and with relative congruence kernels. Consequently, there is shown that the lattice of filters is modular.

This is joint work with J. Kühr.

Crystal monoids

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Crystal basis theory was introduced by Kashiwara in the 90s. It provides an important tool for studying integral representations of the quantum groups $U_q(g)$ (that is, quantum deformations of universal enveloping algebras of Kac-Moody algebras). The theory is combinatorial. A crystal basis can be viewed as finite coloured directed graph. The corresponding crystal graph is then built from the crystal basis in an inductive way using Kashiwara crystal graph operators. The vertices of the crystal graph may be identified with words over a finite alphabet, and a natural congruence may be defined on these words, given in terms of the crystal

structure on the vertices. In this way, associated with each crystal graph is a monoid. In the case that g is the special linear Lie algebra sl_{n+1} (that is, the semisimple Lie algebra of type A_n) the monoid that arises from this construction turns out to be the classical Plactic monoid, denoted $Pl(A_n)$. This is a well-studied monoid which has its origins in work of Schensted and Knuth concerned with certain combinatorial problems and operations on Young tableaux. In a series of papers, Lecouvey has studied the monoids that arise from crystals of other semisimple Lie algebras, specifically those of types B_n, C_n, D_n and G_2. In this talk I will present some recent joint work with A. J. Cain and A. Malheiro on the problem of constructing complete rewriting systems and finding biautomatic structures for these monoids. This work builds on, and generalises, results that we obtained in earlier work for the classical Plactic monoid $Pl(A_n)$.

Forbidden permutation pattern CPSs in the stack-sortable case

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We continue to investigate a new class of constraint satisfaction problems in the context of forbidden permutation patterns. For a set of permutations P the set of permutations avoiding all elements of P is denoted by $A(P)$. We define Forb-Perm-CSP(P) to be the computational problem of deciding whether two given binary relations on a finite set can be extended to linear orders coding a permutation in $A(P)$. Our ultimate goal is to classify the complexity of this problem for all finite sets of permutations P. Based on previous results for separable permutations, we present a polynomial-time algorithm for this problem in the case that P equals 231. For this permutation, $A(P)$ is known as the class of stack-sortable permutations.

Some enumerative and lattice theoretic aspects of islands, and related investigations

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In the talk an overview of three papers of will be given, analyzing the relationships between them. These papers represent three directions of investigation:

- Elementary proof techniques for the maximum number of islands, some exact results, based on paper [1].
- Maximally many islands and related problems, in virtue of the cuts of the height function, based on paper [2].
- CD independent subsets in posets, semilattices and in particular lattice classes, based on the paper [3].

References

[1] Barát , J., Hajnal, P., and Horváth, E. K.: Elementary proof techniques for the maximum number of islands, European J. Combin., **32**, 276–281 (2011)
[2] Horváth, E. K., Šešelja, B., and Tepavčević, A.: Cardinality of height function's range in case of maximally many rectangular islands – computed by cuts, Cent. Eur. J. Math., **11(2)** 296–317 (2013)
[3] Horváth, E. K., and Radeleczki, S.: Notes on CD-independent subsets, Acta Sci. Math. (Szeged) , **78**, 3–24 (2012)

Free medial quandles

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A groupoid $(Q, *)$ is called a medial quandle if it satisfies the following identities:

- $x * x = x$;
- $(x * u) * (y * z) = (x * y) * (u * z)$;

- for all $y, z \in Q$, there exists $x \in Q$ such that $y * x = z$.

We construct free n-generated medial quandles using free $\mathbb{Z}[x, x^{-1}]$-modules of rank $n-1$. We call a quandle m-symmetric, if it satisfies

$$(x \cdot (x \cdots (x \cdot y) \cdots) = y.$$

We construct free n-generated m-symmetric medial quandles using free $\mathbb{Z}[x]/t$-modules of rank $n-1$, where $t = (x^m - 1)/(x - 1)$.

This is joint work with Agata Pilitowska (Warsaw Technical University), David Stanovský (Charles University, Prague), and Anna Zamojska-Dzienio (Warsaw Technical University).

Deciding the existence of a k-wnu operation in polynomial time

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We call a k-ary operation t on a set A a *k-ary weak near unanimity operation (k-wnu)* if t is idempotent and satisfies the equations

$$t(x, x, \dots, x, x, y) \approx t(x, x, \dots, x, y, x) \approx \cdots \approx t(y, x, \dots, x, x, x)$$

for all $x, y \in A$.

We show that if $\mathbf{A}$ is a finite idempotent algebra that admits some wnu operation, then $\mathbf{A}$ has a k-wnu term operation if and only if for every $a, b \in A$ there exists a "local k-wnu": a k-ary term operation $t_{a,b}$ such that

$$t_{a,b}(a, a, \dots, a, b) \approx t_{a,b}(a, a, \dots, b, a) \approx \cdots \approx t_{a,b}(b, a, \dots, a, a).$$

Using this result, one can (for a fixed k) obtain a polynomial time algorithm that decides whether an algebra $\mathbf{A}$ (described by tables of its basic operations) has a k-wnu. This is a part of a larger project to characterize the complexity of deciding strong Maltsev conditions.

Finitely generated subsemigroups of $T(X, Y)$

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It is well known that a countable set of transformations on an infinite set X is contained in a two-generated subsemigroup of the full transformation semigroup on X. If $Y \subset X$, then $T(X, Y)$, the set of all transformations on X with an image in Y, forms a semigroup of transformations with restricted range, studied in 1975 by Symons. We present a sufficient and necessary condition that a countable subset of $T(X, Y)$ is contained in a three-generated subsemigroup of $T(X, Y)$.

This is joint work with Nareupanat Lekkoksung.

On varietal joins of MV-algebras and some varieties

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I will describe the joins of the variety of MV-algebras with some varieties in the lattice of subvarieties of the so-called lattice effect algebras.

Subdirectly irreducible commutative idempotent semirings

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Semirings are unitary rings whose addition operation is not necessarily invertible. They also generalize distributive lattices. Since every variety is generated by its subdirectly irreducible members it is important to know all of these members. Generalizing a result of Guzmán who solved this problem for the variety of Boolean semirings we provide a

partial solution of this problem for the larger variety of commutative idempotent semirings.

This is joint work with Ivan Chajda.

Optimal strong Mal'cev conditions for congruence meet-semidistributivity in locally finite varieties

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We prove some new strong Mal'cev conditions which are optimal with respect to complexity of operations and number of equations. We use the characterization of bounded width Constraint Satisfaction problems in our proofs. Some open questions will be presented.

This is joint work with Jelena Jovanović, Ralph McKeznie, and Matthew Moore.

Algebra and the complexity of quantified constraints

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We survey connections between algebra and the complexity of Quantified Constraint Satisfaction Problems over finite templates. The complexity of such problems is well-known to hinge on their surjective polymorphisms, and early results studied the complexity divide between P and NP-hard. More recent work focuses on the gap between NP and PSPACE-hard and the connections to the so-called Polynomial Generated Powers property of the respective algebra's direct powers.

The length of terms

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In a finite algebra, for a natural number n there are finitely many distinct n-ary functions on the underlying set. Therefore there are only finitely many n-ary term functions, but usually infinitely many different terms with n variables in the language of the algebra. In general, it is not obvious to find the minimal length of n-ary terms such that among all n-ary terms of that length one can find all n-ary terms that represent all different n-ary term functions of the algebra. We obtain such a bound for 3-supernilpotent finite expanded groups, if the expanded group is a group expanded by one unary operation that preserves the neutral element of the group.

This is joint work with Erhard Aichinger and Marijana Lazić.

Factor congruence lifting property

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The Idempotents Lifting Property in ring theory has inspired the study of lifting properties for algebras related to logic; for instance, the Boolean Lifting Property (BLP) in residuated lattices and bounded distributive lattices is the property that all Boolean elements can be lifted modulo every congruence [1,2,3,4,5,6]. The issue of defining lifting properties adequate for the setting of universal algebras naturally arises; one such generalization that applies to any universal algebra is studied in [2,3]; another one, called Congruence Boolean Lifting Property (CBLP), applies to congruence-distributive algebras and involves the Boolean center of the lattice of congruences of these algebras [6]. If we alter the CBLP, by referring to the Boolean algebra of factor congruences instead of the Boolean center, we obtain what we have called the Factor Congruence Lifting Property (FCLP) for congruence-distributive algebras. The

FCLP has meaningful algebraic properties, even in the absence of the condition of compactness of the top element of the lattice of congruences, which CBLP required, and is likely to hold topological characterizations as the ones we have obtained for the BLP [3] and CBLP [6]. FCLP and CBLP coincide in arithmetical algebras, such as residuated lattices, in which they also coincide to the BLP, but differ, for instance, in bounded distributive lattices, where CBLP is trivial, while FCLP coincides to the BLP. Concerning the reticulation functor from the category of residuated lattices to that of bounded distributive lattices, it turns out that this functor reflects the FCLP, but it does not preserve the FCLP, not even when restricted to the subcategory of Gödel algebras, whose reticulations are isomorphic to their underlying bounded lattices.

This is joint work with George Georgescu.

References

[1] G. Georgescu, C. Muresan, Boolean Lifting Property for Residuated Lattices, *Soft Computing* 18, Issue 11 (November 2014), 2075–2089.

[2] C. Muresan, Lifting Properties Versus t–filters, *Analele Universitatii din Bucuresti. Seria Informatica. Proceedings of the Workshop Theory Day in Computer Science (DACS 2014 - November 15th – November 16th)* LXI (2014), 63–77.

[3] G. Georgescu, D. Cheptea, C. Muresan, Algebraic and Topological Results on Lifting Properties in Residuated Lattices, *Fuzzy Sets and Systems* 271 (July 2015), 102–132.

[4] D. Cheptea, G. Georgescu, C. Muresan, Boolean Lifting Properties for Bounded Distributive Lattices, *Scientific Annals of Computer Science* XXV, Issue 1 (2015), 29–67.

[5] D. Cheptea, C. Muresan, A Note on Boolean Lifting Properties for Bounded Distributive Lattices, accepted for publication in *Analele Universitatii din Bucuresti. Seria Informatica. Proceedings of the Workshop Theory Day in Computer Science (DACS 2015)*.

[6] G. Georgescu, C. Muresan, Congruence Boolean Lifting Property, submitted.

A Birkhoff theorem for varieties defined by linear equations

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Many of Mal'cev conditions naturally appearing in universal algebra are defined by linear equations, i.e., such equations that do not include term composition. We will discuss a variant of Birkhoff's HSP theorem for varieties defined by such equations.

This is joint work with Libor Barto and Michael Pinsker.

Tense orthocomplemented posets

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For orthocomplemented posets, we introduce the so-called tense operators. We present a canonical construction of them using the notion of a frame. Tense operators express the quantifiers "it is always going to be the case that" and "it has always been the case that" and hence enable us to express the dimension of time in the logic without any kind of implication. A crucial problem concerning tense operators is their representation. Having an orthocomplemented poset with tense operators, we can ask if there exists a frame such that each of these operators can be obtained by the canonical construction. Using the notion of an M-base and a representation theorem due to Katrnoška we solve this problem.

This is joint work with Ivan Chajda.

Differences and similarities between local function and local closure function in ideal topological spaces

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For a topological space $\langle X, \tau \rangle$ and an ideal $\mathcal{I}$ on X, a triplet $\langle X, \tau, \mathcal{I} \rangle$ is called an ideal topological space. Local function in $\langle X, \tau, \mathcal{I} \rangle$, defined by $A^* = \{x \in X : A \cap U \notin \mathcal{I} \text{ for each } U \in \tau(x)\}$, is a generalization of a topological closure. Local closure function, introduced by A. Al–Omari and T. Noiri, defined by $\Gamma(A) = \{x \in X : A \cap \mathrm{Cl}(U) \notin \mathcal{I} \text{ for each } U \in \tau(x)\}$, is a generalization of θ-closure and local function. Differences and similarities between those two functions are examined varying several common ideals on X, like ideal of finite sets, countable sets, scattered sets, relatively compact sets, nowhere dense sets and meager sets.

Reconstructing the topology of polymorphism clones

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Every clone of functions comes naturally equipped with a topology—the topology of pointwise convergence. A clone C is said to have automatic homeomorphicity with respect to a class $\mathcal{K}$ of clones, if every clone-isomorphism of C to a member of $\mathcal{K}$ is already a homeomorphism (with respect to the topology of pointwise convergence). I am going to talk about automatic homeomorphicity-properties for polymorphism clones of countable homogeneous relational structures. The results base on (and extend) previous results by Bodirsky, Pinsker, and Pongrácz.

This is a joint work with Maja Pech.

Characterization of the intra-regular semigroups in terms of fuzzy points

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For a non-empty set S, a fuzzy subset of S is, by definition, an arbitrary mapping $f : S \to [0, 1]$, where $[0, 1]$ is the usual interval of real number. In this paper, we give some characterizations of the regular semigroups and the intra-regular semigroups in terms of fuzzy points.

This is a joint work with Somsak Lekkoksung.

Abelian quandles

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An algebra is said to be quasi-affine if it is a subreduct (a subalgebra of a reduct) of a module. Quasi-affine algebras are always abelian (diagonally normal), meaning that the diagonal is a block of a congruence of the square $A \times A$. On the other hand, not all abelian algebras are quasi-affine, but these two notions are equivalent under some additional assumptions. In particular, it is true for abelian simple idempotent algebras [K.Kearnes]. The problem, whether every idempotent abelian algebra has this property, remains open. Using a structure theorem we provide a characterization of abelian quandles (idempotent, left-distributive left-quasigroups) and their quasi-affine representation.

This is a joint work with Přemysl Jedlička (Prague), David Stanovský (Prague), and Anna Zamojska-Dzienio (Warsaw).

Critical points for congruence lattices

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For varieties V and W we define the critical point $\mathrm{Crit}(V;W)$ as the smallest cardinality of a semilattice isomorphic to $\mathrm{Con}_c A$ for $A \in V$ but not for $A \in W$. (Here $\mathrm{Con}_c A$ is the semilattice of all compact congruences of A.) We are interested mainly in the case when the critical point is infinite. We recall the most important results and methods, in particular the method based on liftings of semilattice diagrams. We present some new ideas and examples, especially examples with the critical point $\aleph_1$.

Atoms and coatoms in the lattice of congruence lattices of algebras on a (finite) set

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For a fixed (finite) set A let $\mathcal{E}$ denote the lattice of congruence lattices of algebras with base set A. We give an explicit description of the atoms and coatoms in $\mathcal{E}$. In particular we indicate a set F of unary functions on A such that the coatoms of $\mathcal{E}$ are exactly the congruence lattices of the form $Con(A, f)$ with $f \in F$.

This is a joint work with Danica Jakubíková-Studenovská and Sándor Radeleczki.

Some connection between algebraic structures and block codes

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In this paper, we study the relationship between BCK-algebras, partially ordered sets and binary block codes. We show that we can assign to any ordered structures a block codes and conversely. This talk is a part of a paper that submitted for publication.

This is a joint work with A. Borumand Saeid, H. Fatemidokht, and C. Flaut.

Topics in Hilbert algebras

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Hilbert algebras are important tools for certain investigations in intuitionistic logic and other non-classical logics. We introduce new types of filters in Hilbert algebra and study them in detail and put in evidence new connections between different types of filters. After that, we introduce new types of Hilbert algebras and investigate their properties. Also, we give the relationships between these Hilbert algebras and other algebraic structures.

This is a joint work with A. Soleimani Nasab.

Compatible functions on groups

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Given a group G, A. Chandy proved that the inner automorphism near-ring $\mathrm{I}(G)$, which is the near-ring of all zero-preserving polynomial functions on G, is a *ring* if and only if G is a 2-Engel group. We investigate those groups for which even the larger near-ring of zero-symmetric compatible functions $\mathrm{C}_0(G)$ forms a ring. Examples are provided by affine complete 2-Engel groups. To investigate those, we complete the description of the affine completeness status for all groups of order less than 100. This work was supported by the Austrian Science Fund FWF (P24077).

Profinite algebras and polynomial boundedness

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A topological algebra is called profinite if it is representable as a projective limit of finite discrete algebras. Profiniteness is a property concerning the interplay between the topological and the algebraic structure of a topological algebra rather than a simple conjunction of topological and algebraic conditions. However, for topological groups profiniteness turns out to be a purely topological property as it is equivalent to the underlying topological space being a Stone space, i.e., a totally disconnected compact Hausdorff space. This is due a classical result by van Dantzig. Moreover, the same happens to be true for topological rings due to Anzai and Kaplansky as well as for topological semigroups due to Numakura. In the talk I will introduce the concept of polynomial boundedness for arbitrary universal algebras and explain why for a polynomially bounded topological algebra profiniteness is equivalent to the underlying topological space being a Stone space. Since groups, semigroups, rings, and semirings are indeed polynomially bounded, all the results addressed above arise as special instances of this result. Apart

from sketching the proof, I will discuss some more interesting examples. This is a joint work with Jens Zumbrägel.

Admissible rules of (fragments of) R-Mingle

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A logical consequence rule is called admissible in a logic if it can be added to the logic without changing its theorems.

Bases (axiomatizations) of admissible rules for all proper fragments of the logic R-Mingle have been obtained. We extend these results here to the $\{\to, \neg, t\}$-, $\{\to, \cdot, t\}$-, and $\{\to, t\}$-fragments of R-Mingle with an additional constant t which algebraically corresponds to the variety of Sugihara monoids.

This is a joint work with George Metcalfe.

On the category of affine systems

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In [5], S. Vickers introduced the notion of topological system as a common framework for both topological spaces and the underlying algebraic structures of their topologies – locales. In particular, the category of locales (resp. topological spaces) is isomorphic to a full (resp. co)reflective subcategory of the category of topological systems, which provides the so-called system localification (resp. spatialization) procedure.

In [2], Y. Diers introduced the concept of algebraic or affine set, which included topological spaces as a particular example. Following [4], we present the notion of affine system, which extends topological systems of S. Vickers and state property systems of D. Aerts [1], and show that

the category of affine sets is isomorphic to a full coreflective subcategory of the category of affine systems, providing thus an affine analogue of the spatialization procedure for topological systems. The difference of our setting from that of Y. Diers is the buildup of both affine sets and systems over an arbitrary category instead of the category of sets.

The main contribution of this talk is the necessary and sufficient condition for the dual category of the variety of algebras, whose objects underly the structure of affine sets, to be isomorphic to a full reflective subcategory of the category of affine systems, thereby providing an affine analogue of the localification procedure for topological systems. One arrives thus at a restatement of the sobriety-spatiality equivalence for affine sets, which is patterned after the equivalence between the categories of sober topological spaces and spatial locales [3]. Moreover, the existence of the localification procedure for affine systems induces their category to be essentially algebraic. We also show a sufficient condition for the category of separated affine sets to make a reflective subcategory of the category of affine sets, extending the result that the category of T_0 topological spaces makes a reflective subcategory of the category of topological spaces.

References

[1] D. Aerts, *Foundations of quantum physics: a general realistic and operational approach*, Int. J. Theor. Phys. **38** (1999), no. 1, 289–358.

[2] Y. Diers, *Categories of algebraic sets*, Appl. Categ. Struct. **4** (1996), no. 2-3, 329–341.

[3] P. T. Johnstone, *Stone Spaces*, Cambridge University Press, 1982.

[4] S. Solovyov, *Categorically-algebraic topology versus universal topology*, Fuzzy Sets Syst. **227** (2013), 25–45.

[5] S. Vickers, *Topology via Logic*, Cambridge University Press, 1989.

Deciding subpower membership for semigroups

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For a fixed semigroup S, we define the following problem: Given tuples $a_1, \ldots, a_k, b$ in a direct power S^n, can b be generated by $a_1, \ldots, a_k$ under componentwise multiplication? For commutative semigroups and idempotent semigroups this problem is in NP. In both cases a P/NP-complete dichotomy is presented.

Extending the Blok-Esakia theorem

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The Blok-Esakia theorem asserts that there is an isomorphism from the lattice of logics extending intuitionistic logic onto the lattice of normal modal logics extending Grzegorczyk logic. Algebraically, it says that the lattice of varieties of Heyting algebras is isomorphic with the lattice of varieties of Grzegorczyk modal algebras (they are closure algebras satisfying one additional identity).

We revisit Blok's algebraic proof of this classical result. It appears that one can get from it more than Blok stated.

Cube term blockers without finiteness

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Let $\mathbf{A}$ be an idempotent algebra. For finite $\mathbf{A}$, Marković, Maróti, and McKenzie (2012) introduced cube term blockers (U, B) to recognize when

A has no cube term; here, $U \subseteq B$ are subuniverses of **A**. We extend this characterization to arbitrary idempotent algebras **A**; in our cube term blockers the subalgebra **B** of **A** is replaced by the 2-generated free algebra in the variety $\mathcal{V}(\mathbf{A})$. We also characterize when **A** has no cube term of a fixed arity. As a consequence, we get a sharp upper bound on the minimum arity of a cube term in **A**, provided **A** has a cube term and the signature of **A** is finite.

This is a joint work with Keith A. Kearnes.

Divisibility in the Stone-Čech compactification

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A semigroup operation on a discrete topological space S can be extended to its Stone-Čech compactification βS. This construction proved to have many applications in various areas such as infinite combinatorics and topological dynamics. One of the main features of βS is that every (continuous) function on S has unique continuous extension in βS, and it makes sense, after introducing a proper definition of a continuous relation, to investigate possibilities of extending relations as well. There are several possible ways to extend the divisibility relation on the set N of natural numbers to βN, some of them continuous and others not. For four such extension relations we investigate equivalent conditions for divisibility and apply them to transfer certain properties of functions on N to their extensions on βN. The motivation behind this is to acquire better understanding of some infinitary problems of elementary number theory.

On regular congruences of ordered semigroups

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An ordered semigroup is a structure $\mathbf{S} = \langle S, \cdot, \leq \rangle$ with a binary operation $\cdot$ that is associative and a partial ordering $\leq$ that is compatible with the binary operation. For a given congruence relation θ of the semigroup $\mathbf{S} = \langle S, \cdot \rangle$ the quotient structure $\mathbf{S}/\theta = \langle S/\theta, \cdot_\theta, \leq_\theta \rangle$ is not in general an ordered semigroup. In this paper we study quotients of ordered semigroups. We first define a special type of congruences, called regular congruences, that will preserve ordering on the quotient structures. We then show that the set of all regular congruences with the ordering $\leq$ is an algebraic lattice. Afterwards, we discuss the link between finitely generated regular congruences and subdirectly irreducible ordered semigroups. At the end we will discuss generalization of these concepts to an arbitrary ordered algebra.

Rank properties of transformation semigroups with restricted range

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We study the transformation semigroups $T(X, Y)$ with restricted range where $X \in \{\mathbb{N}, \mathbb{Z}, \mathbb{Q}\}$ and Y is a non-empty subset of X. In particular, we determine the relative rank of $T(X, Y)$ modulo the semigroup of order-preserving transformation in $T(X, Y)$. This is a generalization of the results concerning full transformation semigroups studied by P.M. Higgins, J.D. Mitchell and N. Ruškuc.

The geometry of positive commutative totally ordered monoids

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A finite commutative monoid may be described by means of a congruence on N^n. Congruences of free commutative monoids have been described by Eilenberg and Schtzenberger in their well-known 1969 paper as well as by several further authors. Our topic are finite, positive, commutative tomonoids, that is, finite commutative monoids that are endowed with a positive compatible total order. These structure occur in the context of finitely-valued fuzzy logic. We adapt the description of congruences on N^n to this specific context. To include the total order, we furthermore introduce what we call direction f-cones, which represent the order in rough analogy to the case of positive cones of totally ordered groups. We show how direction f-cones can be built up in a stepwise fashion, where one step for each Archimedean class is needed.

The size of generating sets of powers

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For every finite algebra we prove that either it has the polynomially generated powers property, or it has the exponentially generated powers property. For idempotent algebras we give a simple criterion for the algebra to satisfy the exponentially generated powers property.

On the minimal arity of near-unanimity term operations for finite algebras

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In 2005 M.Maroti proved that having a near-unanimity term operation (NU) is a decidable property of a finite algebra, but he didn't give any upper bound on the minimal arity of NU. In 2013 D.Zhuk obtained an upper bound, which automatically gives an algorithm to decide the property. Precisely, he showed that a finite algebra with NU has NU of arity at most $|A|^2 \cdot (|A| \cdot m)^{(3|A|)^{|A|}}$, where m is the maximal arity of fundamental operations. We improved this result and showed that $m|A|^3/2$ is an upper bound, and $(m-1)|A|(|A|-1)/2+1$ is an upper bound for idempotent algebras. Moreover, we proved for a finite idempotent algebra $(A; f_1, \dots, f_s)$ with NU that it has NU of arity at most

$$1 + \sum_{i=1}^{s} (arity(f_i) - 1),$$

and showed that both upper bounds for idempotent algebras cannot be improved.

This is a joint work with Alexandr Kazda.

PROGRAMME

Thursday, June 4

17:00 – 21:00 Registration (Reading Room, DMI – Mathematics & Informatics building, ground floor)

Friday, June 5 – Morning

8:15 – 9:15 Registration (Rectorate – The central building of UNS, ground floor)

	Amphitheatre	Room I	Room II
	SESSION P1 (Chair: I. Dolinka)		
9:30 – 9:45	***Opening ceremony***		
9:45 – 10:35	**Keith A. Kearnes:** *Problems on the frontier of commutator theory*		
10:40 – 11:15	***Coffee break***		
11:15 – 12:05	**James D. Mitchell:** *Chains of subsemigroups*		

Friday, June 5 – Afternoon

	Amphitheatre	Room I	Room II
	SESSION P2 (Chair: E. Aichinger)		
14:30 – 15:20	**Peter Mayr:** *Computations in direct powers*		
15:30 – 15:50	**Robert D. Gray:** *Crystal monoids*		
15:55 – 16:30	***Coffee break***		
	SESSION A1 (Chair: R. D. Gray)	**SESSION B1 (Chair: P. Đapić)**	**SESSION C1 (Chair: K. Adaricheva)**
16:30 – 16:50	**Barnaby Martin:** *Algebra and the complexity of quantified constraints*	**Přemysl Jedlička:** *Free medial quandles*	**Claudia Mureşan:** *Factor congruence lifting property*
17:00 – 17:20	**Dimitriy Zhuk:** *The size of generating sets of powers*	**Agata Pilitowska:** *Abelian quandles*	**Laura Janina Schnüriger:** *Admissible rules of (fragments of) R-Mingle*
17:30 – 17:50	**Markus Steindl:** *Deciding subpower membership for semigroups*	**Eszter K. Horváth:** *Some enumerative and lattice theoretic aspects of islands, and related investigations*	

19:30 – ... Conference dinner

Saturday, June 6 – Morning

	Amphitheatre	Room I	Room II
	SESSION P3 (Chair: R. Pöschel)		
9:00 – 9:50	**Wieslaw Kubiś:** *Fraïssé categories and their applications*		
10:00 – 10:20	**Ágnes Szendrei:** *Cube term blockers without finiteness*		
10:25 – 11:00	***Coffee break***		
	SESSION A2 (Chair: K. A. Kearnes)	**SESSION B2 (Chair: W. Kubiś)**	**SESSION C2 (Chair: J. D. Mitchell)**
11:00 – 11:20	**Dimitriy Zhuk:** *On the minimal arity of near-unanimity term operations for finite algebras*	**Sergejs Solovjovs:** *On the category of affine systems*	**Thomas Vetterlein:** *The geometry of positive commutative totally ordered monoids*
11:30 – 11:50	**Alexandr Kazda:** *Deciding the existence of a k-wnu operation in polynomial time*	**Christian Pech:** *Reconstructing the topology of polymorphism clones*	**Jörg Koppitz:** *Finitely generated subsemigroups of T(X,Y)*
12:00 – 12:20	**Petar Marković:** *Optimal strong Mal'cev conditions for congruence meet-semidistributivity in locally finite varieties*	**Friedrich Martin Schneider:** *Profinite algebras and polynomial boundedness*	**Kittisak Tinpun:** *Rank properties of transformation semigroups with restricted range*

Saturday, June 6 – Afternoon

	Amphitheatre	Room I	Room II
	SESSION P4 (Chair: Á. Szendrei)		
14:30 – 15:20	**Kira Adaricheva:** *Increasing the role of the D-basis as an implicational basis of choice in data analysis applications*		
15:30 – 15:50	**Reinhard Pöschel:** *Atoms and coatoms in the lattice of congruence lattices of algebras on a (finite) set*		
15:55 – 16:30	***Coffee break***		
	SESSION A3 (Chair: B. Šešelja)	**SESSION B3 (Chair: M. Maróti)**	**SESSION C3 (Chair: A. Tepavčević)**
16:30 – 16:50	**Jan Paseka:** *Tense orthocomplemented posets*	**Dejan Delić:** *Existential pebble games with rank*	**Arsham Borumand Saeid:** *Topics in Hilbert algebras*
17:00 – 17:20	**Ivan Chajda:** *Orthomodular posets can be organized as conditionally residuated structures*	**Mike Behrisch:** *CSP dichotomy for solving systems of equations on 3*	**Marjan Kuchaki Rafsanjani:** *Some connection between algebraic structures and block codes*
17:30 – 17:50	**Miroslav Ploščica:** *Critical points for congruence lattices*	**Tom Hanika:** *Forbidden permutation pattern CSPs in the stack-sortable case*	**Jan Kühr:** *On varietal joins of MV-algebras and some varieties*
18:00 – 18:20	**Gábor Czédli:** *The asymptotic number of planar, slim, semimodular lattice diagrams*	**Bojan Bašić:** *Absorption in semigroups and n-ary semigroups*	**Petr Emanovský:** *Quasivariety of pseudo BCI-algebras and its properties*

Sunday, June 7 – Morning

	Amphitheatre	Room I	Room II
	SESSION P5 (Chair: P. Marković)		
9:00 – 9:50	**Miklós Maróti:** *Quasiorder lattices of varieties*		
		SESSION B4 (Chair: R. Sz. Madarász)	
10:00 – 10:20	**Helmut Länger:** *Subdirectly irreducible commutative idempotent semirings*	**Jakub Opršal:** *A Birkhoff theorem for varieties defined by linear equations*	
10:25 – 11:00	***Coffee break***		
	SESSION A4 (Chair: P. Mayr)		**SESSION C4 (Chair: D. Mašulović)**
11:00 – 11:20	**Michai Chiş:** *Some properties of autocommutator subgroups of 2-groups*	**Boža Tasić:** *On regular congruences of ordered semigroups*	**Michał Stronkowski:** *Extending the Blok-Esakia theorem*
11:30 – 11:50	**Frederik Saxinger:** *Compatible functions on groups*	**Krisztina Ágó:** *On generalized highly potential words*	**Boris Šobot:** *Divisibility in the Stone-Cech compactification*
12:00 – 12:20	**Nebojša Mudrinski:** *The length of terms*	**Dara Phusanga:** *Characterization of the intra-regular semigroups in terms of fuzzy points*	**Aleksandar Pavlović:** *Differences and similarities between local function and local closure function in ideal topological spaces*
12:30 – 12:50	**Erhard Aichinger:** *Independence of algebras*		
12:55 – 13:00	***Closing remarks***		