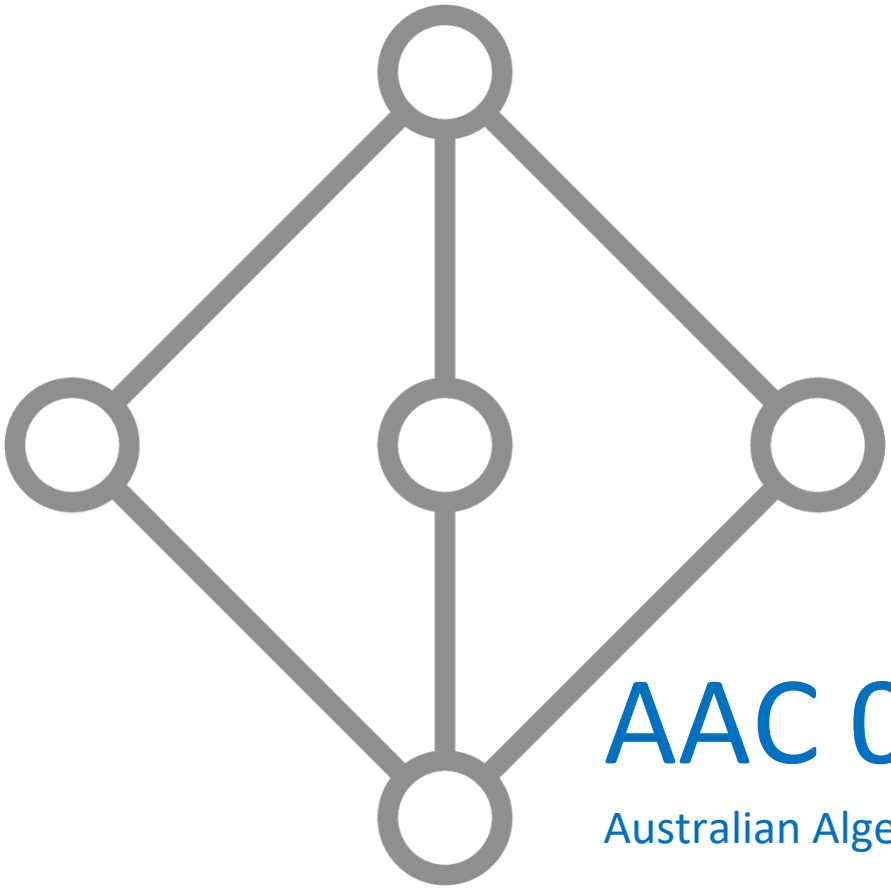


AAC 05

Australian Algebra Conference

17 – 19 November 2021
the University of Western Australia

Welcome

Welcome to the fifth Australian Algebra Conference!

The aim of the annual Australian Algebra Conference is to foster communication between algebraists in Australia. We interpret algebra broadly, including areas such as topological algebra, algebraic logic, graph theory and coding theory. The conference is run by the Australian Algebra Group, which is a special interest group of the Australian Mathematical Society. The Australian Algebra Conference began life as the Victorian Algebra Conference and has been held every year since 1982.

The AAC has a proud tradition of encouraging talks by students and aims to provide students in algebra with the opportunity to give their first public presentation in a relaxed and supportive environment. Each conference, the most outstanding student talk is awarded the Gordon Preston Prize.

This year we are excited to have three international plenary speakers:
Alejandra Garrido (Universidad Autónoma de Madrid), Eugenio Giannelli (Università degli Studi di Firenze), and Melissa Lee (University of Auckland).

Links

All talks will be given via Zoom. There are two streams - please check the timetable to see which stream is appropriate for the talks that you will attend. The Zoom links for each day are given under the timetable for that day. Please note that the links change from day to day.

We would also like to encourage socialisation via Gather at this link. There will be a few theorems scattered around during the conference... See if you can work out who is responsible for them!

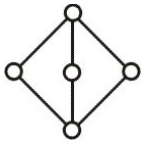
The conference website is: `https://aac05.github.io/`

Conference "photo"

Immediately after the presentation of the Gordon Preston Prize, we intend to take a conference "photo". This will simply be a screenshot of the Zoom participants. If you want to be part of this, please make sure to be present with you camera turned on! We will email this to anyone who is interested, as well as posting it on the conference website.

Timezone

All times are given in Perth time (AWST = UTC/GMT + 8 hours). Please make sure to convert to your local time! For example, 12.00 AWST = 14.00 AEST = 15.00 AEDT = 17.00 NZDT



Australian
Algebra
Group

Wed 17 November 2021

	Stream A
11:50–12:00	Conference Welcome
12:00–12:20	Ian Wanless, "Maximally nonassociative quasigroups"
12:30–12:50	Jack Allsop, "Solution to a question of Falconer on quasigroup varieties"
13:00–13:20	Lei Chen, "Vertex-primitive s-arc-transitive digraphs of almost simple groups"

	Stream A	Stream B
14:00–14:20	Murray Elder, "The isomorphism problem for plain groups is in Σ_3^{P}"	Pankaj Kumar Manjhi, "Mutually Orthogonal Latin squares and Frobenius Group"
14:30–14:50	John Cu, "Experimenting with rewriting systems"	Stephen Glasby, "On the maximum of the weighted binomial sum $2^{-r}\sum_{i=0}^{r}\binom{m}{i}$"
15:00–15:20	Edmund Heng, "Generalised braid groups, categorification and dynamics"	Mihai-Silviu Lazorec, "On the average order of a finite group"

	Stream A
16:00–16:45	**Alejandra Garrido, Simple groups of homeomorphisms of Cantor space**

Stream A
Zoom (Wednesday only!)

Stream B
Zoom (Wednesday only!)

NOTE: Please make sure your Zoom username corresponds to your real name. This will make it easier for us to verify that you are a registered participant, and let you in to the Zoom session from the waiting room. Arriving a minute or two early will also accelerate this process.

Official times are given in Perth time (AWST = UTC/GMT + 8 hours). Please convert to your local timezone!

Thur 18 November 2021

	Stream A
12:00–12:20	Roozbeh Hazrat, "Irreducible representations of Leavitt algebras"
12:30–12:50	Ivo Vekemans, "Mackey and Tambara functors as G-commutative monoids"
13:00–13:20	Kane Townsend, "Levi subgroups minimally containing Sylow subgroups"

	Stream A	Stream B
14:00–14:20	Kevin Limanta, "Super Catalan Numbers and Fourier Summation over Finite Fields"	Jesse Lansdown, "There are no block-transitive subspace designs"
14:30–14:50	Su Yuan Chan, "Bounds on the Inducibility of Double Loop Graphs"	Heiko Dietrich, "Galois trees for p-groups of maximal class"
15:00–15:20	Darryl Teo, "On the Intersection Multiplicity of Plane Curves"	Richard Garner, "The variety of cartesian closed varieties"

	Stream A
16:00–16:45	**Eugenio Giannelli, "On Sylow Branching Coefficients"**

Stream A
Zoom (Thursday only!)

Stream B
Zoom (Thursday only!)

NOTE: Please make sure your Zoom username corresponds to your real name. This will make it easier for us to verify that you are a registered participant, and let you in to the Zoom session from the waiting room. Arriving a minute or two early will also accelerate this process.

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Fri 19 November 2021

	Stream A
12:00–12:45	**Melissa Lee, "An algebraic tasting platter"**

	Stream A
13:00–13:10	Presentation of Gordon Preston Prize & conference "photo"

	Stream A	Stream B
13:30–13:50	Youming Qiao, "Some new connections between groups and graphs"	James East, "Ehresmann theory and partition monoids"
14:00–14:20	Santiago Barrera Acevedo, "Cocyclic Two Circulant Core Hadamard Matrices"	Andrew Craig, "Dual digraphs of finite semidistributive lattices"
14:30–14:50		Marcel Jackson, "On kernels of relations"

Stream A
Zoom (Friday only!)

Stream B
Zoom (Friday only!)

NOTE: Please make sure your Zoom username corresponds to your real name. This will make it easier for us to verify that you are a registered participant, and let you in to the Zoom session from the waiting room. Arriving a minute or two early will also accelerate this process.

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Abstracts

1. Irreducible representations of Leavitt algebras

Roozbeh Hazrat (Western Sydney University)

Thur 18 November 2021 12:00

For a graph E we construct a "representation graph" F and consequently a representation V_F for the Leavitt path algebra $L(E)$. Our approach gives a completely new way to construct Chen/Rangaswamy simple modules of these algebras. Besides being more visual, this approach allows for generalising to weighted graphs and produce irreducible representations for Leavitt algebras $L(n, m)$. This is a joint work with Raimund Preusser and Alexander Shchegolev from St. Petersburg.

2. Galois trees for p-groups of maximal class

Heiko Dietrich (Monash University)

Thur 18 November 2021 14:30

It is an ongoing research project to investigate the structure of the infinite graph associated with the finite p-groups of maximal class. (In a broader context, this research is part of Coclass Theory.) In this talk, I report on a new approach for describing the growth of this graph by exhibiting some new periodic patterns. This is joint work with Alexander Cant, Bettina Eick, and Tobias Moede (University of Braunschweig).

3. Maximally nonassociative quasigroups

Ian Wanless (Monash University)

Wed 17 November 2021 12:00

A quasigroup is a set equipped with multiplication, left division and right division. A quasigroup $(Q, *)$ is said to be *maximally nonassociative* if

$$(x * y) * z = x * (y * z) \iff x = y = z,$$

where $x, y, z \in Q$.
A quasigroup over the finite field $\mathbb{F}_q$ is *quadratic* if its operation is defined by

$$u * v = \begin{cases} u + a(v - u) & \text{if } v - u \text{ is a square;} \\ u + b(v - u) & \text{otherwise.} \end{cases}$$

for fixed $a, b \in \mathbb{F}$.
We prove that there are at least $(c + o(1))q^2/\log q$ maximally nonassociative quadratic quasigroups over $\mathbb{F}_q$ for some constant $c > 0$. Leveraging that result, we are able to show that a maximally nonassociative quasigroup of order n exists for all $n \geq 9$, with the possible exception of

$$n \in \{11, 12, 15, 40, 42, 44, 56, 66, 77, 88, 90, 110\}$$

and orders of the form $n = 2p_1$ or $n = 2p_1p_2$ for odd primes p_1, p_2 with $p_1 \leq p_2 < 2p_1$.
Joint work with Aleš Drápal, Charles University, Prague.

4. The variety of cartesian closed varieties

Richard Garner (Macquarie University)

Thur 18 November 2021 15:00

A variety V is said to be cartesian closed when the category of V-algebras and homomorphisms is cartesian closed. Two basic classes of examples are the variety of M-sets for a monoid M, and the variety of B-sets over a Boolean algebra B (in the sense of Bergman).
In 1990, Peter Johnstone gave a delicate syntactic characterisation of the cartesian closed varieties in terms of having "sufficiently many unary operations". In this talk, we refine Johnstone's characterisation to show that a cartesian closed variety is determined by a monoid M and a Boolean algebra B such that B is an M-set, M is a B-set and various further axioms hold. Equivalently, we may say that M is a B-monoid in the sense of Jackson and Stokes.

The pairs (B, M) just described turn out to be equivalent to classical restriction monoids, a.k.a. modal restriction semigroups with preferential union. As shown by Jackson and Stokes, these entities are varietal, and so we draw the surprising conclusion that: cartesian closed varieties form a variety.
There is also a link to non-commutative geometry, since classical restriction monoids are equivalent to source-etale ample topological categories. If time permits we will touch on this briefly.

5. Generalised braid groups, categorification and dynamics
Edmund Heng (Australian National University)
Wed 17 November 2021 15:00

In this talk, we focus on the study of generalised braid groups (GBG), which are also known as the Artin-Tits groups. These groups are defined as "lifts" of Coxeter groups and they remain rather mysterious despite the simplicity in defining them. One of the famous approaches to understanding GBG is to study their actions on surfaces (mapping class representations), which led to a proof to one of the long standing Tits conjectures. Unfortunately, a restriction was also known: not all GBG have "nice" faithful mapping class representations. Not all hope is lost, however, as we can now overcome this hurdle if we look "higher" through the lens of categorification. Namely, instead of actions on surfaces, we now study actions on (triangulated) categories. In this talk I'll give an overview of GBG and introduce the idea of categorification. I'll then briefly describe how categorification allows us to transfer certain ideas from low-dimensional topology. This in particular leads to a (categorical) dynamical classification of the elements of GBG, similar to the famous Nielsen-Thurston's classification of mapping class groups. This research is part of my PhD thesis.

6. Ehresmann theory and partition monoids
James East (Western Sydney University)
Fri 19 November 2021 13:30

Ehresmann semigroups (and categories) were introduced by Mark Lawson in 1991. Semigroups in this class need not be regular, but still possess many nice properties of regular (even inverse) semigroups. In this talk I will discuss some recent joint work with Robert Gray (East Anglia) that identifies Ehresmann structures on partition monoids, and explores some interesting combinatorial and representation-theoretic consequences. We also introduce a new diagram monoid that can be thought of as a categorical dual of the partial transformation semigroup; this monoid was independently discovered by Timothy Stokes in an entirely different context.

7. The isomorphism problem for plain groups is in Σ_3^{P}
Murray Elder (University of Technology Sydney)
Wed 17 November 2021 14:00

Testing isomorphism of infinite groups is a classical topic, but from the complexity theory viewpoint, few results are known. Sénizergues and Weiß (ICALP2018) proved that the isomorphism problem for virtually free groups is decidable in PSPACE when the input is given in terms of so-called *virtually free presentations*. Here we consider the isomorphism problem for the class of *plain groups*, that is, groups that are isomorphic to a free product of finitely many finite groups and finitely many copies of the infinite cyclic group.
Every plain group is naturally and efficiently presented via an inverse-closed finite convergent length-reducing rewriting system. We prove that the isomorphism problem for plain groups given in this form lies in the polynomial time hierarchy, more precisely, in Σ_3^{P}.
I will explain what this complexity class is, then give some ideas about the ingredients of our proof.
This is joint work with Heiko Dietrich, Adam Piggott, Youming Qiao and Armin Weiß

8. Cocyclic Two Circulant Core Hadamard Matrices
Santiago Barrera Acevedo (Monash University)
Fri 19 November 2021 14:00

The two-circulant core (TCC) construction for Hadamard matrices (HMs) uses two sequences with almost perfect autocorrelation to construct a HM. A research problem of K. Horadam asks whether such matrices are cocyclic. Using ideas from permutation groups, we prove that the order of a cocyclic TCC HM coincides with the order of a HM of Paley type, Sylvester type or certain multiples of these orders. In addition, we show that there exist cocyclic TCC HMs at all allowable order less or equal to 1000 with at most one exception.

9. Some new connections between groups and graphs

Youming Qiao (University of Technology Sydney)

Fri 19 November 2021 13:30

Let p be an odd prime. For a simple undirected graph G, through the classical procedures of Baer (Trans. Am. Math. Soc., 1938), Tutte (J. Lond. Math. Soc., 1947) and Lovász (B. Braz. Math. Soc., 1989), there is a p-group of class 2 and exponent p, P_G, that is naturally associated with G. In this talk, we examine some connections between G and P_G as follows: 1. Connectivity of G and central product decomposability of P_G [1]. 2. The maximum size of independent sets in G and the maximum order of abelian subgroups of P_G [2]. 3. The isomorphism type of G and the isomorphism type of P_G [3]. We discuss some generalisations of these connections, such as vertex and edge connectivities of G and certain group-theoretic properties of P_G regarding central product decompositions. Some new results and questions on P_G inspired by these connections will be reported.

[1] Y. Li, Y. Qiao: Group-theoretic generalisations of vertex and edge connectivities. Proc. Am. Math. Soc. 148: 4679-4693 (2020).
[2] X. Bei, S. Chen, J. Guan, Y. Qiao, X. Sun: From independent sets and vertex colorings to isotropic spaces and isotropic decompositions. SIAM J. Comput., 50(3), 924–971 (2021).
[3] X. He, Y. Qiao: On the Baer-Lovász-Tutte construction of groups from graphs: Isomorphism types and homomorphism notions. Eur. J. Comb. 98: 103404 (2021).

10. Vertex-primitive s-arc-transitive digraphs of almost simple groups

Lei Chen (The University of Western Australia)

Wed 17 November 2021 13:00

The property of s-arc-transitivity has been well-studied for many years. Weiss proved that finite undirected graphs that are not cycles can be at most 7-arc-transitive. On the other hand, Praeger showed that for each s there are infinitely many finite s-arc-transitive digraphs that are not (s+1)-arc-transitive. However, G-vertex-primitive (G,s)-arc-transitive digraphs for large s seem rare. Thus we are interested in finding an upper bound for such s. In 2018, Giudici and Xia showed that it is sufficient to determine s when G is almost simple. We will show that $s \leq 1$ when G is almost simple with socle $Sz(2^{2n+1})$ or ${}^2G_2(3^{2n+1})$ for $n \geq 1$.

11. Solution to a question of Falconer on quasigroup varieties

Jack Allsop (Monash University)

Wed 17 November 2021 12:30

A *quasigroup* is a non-empty set equipped with a binary operation that satisfies left and right cancellation laws. A quasigroup is a *loop* if it has an identity element. Latin squares are a combinatorial equivalent to quasigroups, in the sense that the multiplication table of a finite quasigroup is a Latin square and every Latin square is the multiplication table of a finite quasigroup. An *isotope* of a quasigroup Q is a quasigroup whose multiplication table can be obtained from the multiplication table of Q by a permutation of the rows and columns, as well as permuting the elements of Q. An isotope which is also a loop is called a *loop isotope*. For each prime $p \equiv 1 \bmod 8$ or $p \equiv 3 \bmod 8$ we have constructed a loop L_p of order p which has the following property; every element of every loop isotope of L_p has left order p, and right order coprime to p. This construction answers an open problem stated by Falconer on quasigroup varieties, and an open problem stated by Wanless on Latin squares.

12. Super Catalan Numbers and Fourier Summation over Finite Fields

Kevin Limanta (UNSW Sydney)

Thur 18 November 2021 14:00

We give the super Catalan numbers $S(m,n)$ and their associated family of rational numbers, called the circular super Catalan numbers $\Omega(m,n)$ defined by

$$S(m,n) = \frac{(2m)!\,(2n)!}{m!n!\,(m+n)!} \text{ and } \Omega(m,n) = \frac{S(m,n)}{4^{m+n}}$$

an algebraic interpretation in terms of values of summations of polynomial functions over the unit circle in finite fields of odd characteristic. We consider three metrical geometries, the Euclidean geometry and two Einstein-Minkowski geometries and show that the problem of polynomial summation over the unit circle in each geometry is intricately connected.

This investigation opens up not only the possibility to do prime characteristic harmonic analysis and a connection to characteristic zero harmonic analysis, but also the study of a wide variety of additional (rational) numbers that complement the super Catalan numbers and circular super Catalan numbers.

13. On the average order of a finite group

Mihai-Silviu Lazorec (Faculty of Mathematics, "Alexandru Ioan Cuza" University of Iasi, Romania)

Wed 17 November 2021 15:00

Let $o(G)$ be the average order of a finite group G, i.e., the sum of element orders of G divided by $|G|$. We show that if $o(G) < c$, where $c \in \{\frac{13}{6}, \frac{11}{4}\}$, then G is an elementary abelian 2-group or a solvable group, respectively. Also, we prove that the set containing the average orders of all finite groups is not dense in $[a, \infty)$, for all $a \in [0, \frac{13}{6}]$. We also outline some results related to the integer values of the average order.

14. Mackey and Tambara functors as G-commutative monoids

Ivo Vekemans (The Australian National University)

Thur 18 November 2021 12:30

Given a finite group G, G-Mackey functors and G-Tambara functors arise in the context of G-actions, encoding operations which behave like induction, restriction, and conjugation. For example, in equivariant homotopy theory G-Mackey and G-Tambara functors replace abelian groups and commutative rings respectively. In this talk we see how G-Tambara functors are G-commutative monoids in the G-symmetric monoidal category of G-Mackey functors, defining these terms as we go. We will also see a similar story relating G-Mackey functors and G-coefficient systems.

15. Mutually Orthogonal Latin squares and Frobenius Group

Pankaj Kumar Manjhi (Vinoba Bhave University)

Wed 17 November 2021 14:00

This presentation deals with the construction of mutually orthogonal Latin squares with the help of frobenius group.

16. Experimenting with rewriting systems

John Cu (University of Technology Sydney)

Wed 17 November 2021 14:30

Motivated by recent work of Elder and Piggott (https://arxiv.org/abs/2106.03445), I have implemented several routines in Python which can be used to explore finite convergent inverse-closed length-reducing rewriting systems. My program can generate a rewriting system from a seed word, check if a system is (locally) confluent, normalised, and can compute the order of elements efficiently. Initial experiments with the program have revealed some interesting patterns regarding systems with an alphabet of size two or three, which I hope will lead me to prove some new theorems on rewriting systems.

17. Levi subgroups minimally containing Sylow subgroups

Kane Townsend (The University of Sydney)

Thur 18 November 2021 13:00

We will examine analogous classes of subgroups arising from a finite group of Lie type and its associated Weyl group. In the Weyl group we will consider the minimal parabolic subgroups containing a Sylow subgroup. Similarly, in finite groups of Lie type we will consider the minimal Levi subgroups containing a Sylow subgroup. In some cases these classes of subgroups have the same characterisation. In an attempt to rectify the other cases, we will use Lehrer-Springer theory of regular elements in finite reflection groups. This will give a connection between the reflection subgroups of a Weyl group normalised by a regular element and particular classes of finite reductive subgroups of a finite group of Lie type.

18. Dual digraphs of finite semidistributive lattices

Andrew Craig (University of Johannesburg)

Fri 19 November 2021 14:00

Birkhoff's representation for finite distributive lattices from the 1930s provides a one-to-one correspondence between finite distributive lattices and finite posets. In more recent work, a one-to-one correspondence between arbitrary finite lattices and a special class of digraphs was established. These so-called TiRS graphs are digraphs whose properties generalise those of posets. In particular, they are reflexive but neither anti-symmetric nor transitive. The failure of transitivity is crucial in enabling them to dually represent non-distributive lattices.

In this talk we investigate the dual digraphs of an important subclass of finite lattices: finite semidistributive lattices. We will characterise the dual TiRS graphs and examine the importance of the transitive vertices. This is joint work with Miroslav Haviar (Matej Bel University) and José São João (Stockholm University).

19. Bounds on the Inducibility of Double Loop Graphs

Su Yuan Chan (Deakin University)

Thur 18 November 2021 14:30

In the areas of extremal graph theory, there exists a problem that investigates the maximum induced density of a k-vertex graph H in any n-vertex graph G. This is known as the problem of *inducibility* that was first introduced by Pippenger and Golumbic in 1975. The exact inducibility of only a handful of small graphs and some families of graphs are known. The family of cycles is one of the well-studied problems of inducibility. The exact inducibility for the family of cycles for $k \geq 6$ remains unsolved. A natural next step is to look at graphs with cyclic properties, such as the family of *double loop graphs*. We determine new bounds on the inducibility for this family of graphs and give a general construction for the bounds on the double loop graphs of order 6 and 7. This is joint work with K. Morgan and J. Ugon.

20. On the Intersection Multiplicity of Plane Curves

Darryl Teo (The University of Western Australia)

Thur 18 November 2021 15:00

An algebraic curve consists of the set of pairs $(x, y) \in K^2$, where K is a field, which satisfy the polynomial equation $f(x, y) = 0$. Given a pair f and g of algebraic curves, a natural question to ask is where and how they intersect. This talk will focus on an aspect of the latter: specifically, the concept of intersection multiplicity, which loosely measures "how many times" two curves meet at a single intersection point. We will briefly outline the history of this idea, which is built on a number of classical concepts, before discussing the axiomatic approach to intersection multiplicity, which was first treated by William Fulton in [1]. This approach has the advantage of being cleaner than the classical approaches, both from a calculational perspective and from a theoretical perspective, and deserves to be more widely known for these reasons.

[1] W. Fulton. *Algebraic Curves: An Introduction to Algebraic Geometry*. Benjamin, third edition, 2008.

21. On the maximum of the weighted binomial sum $2^{-r} \sum_{i=0}^{r} \binom{m}{i}$

Stephen Glasby (The University of Western Australia)

Wed 17 November 2021 14:30

Add the first $r+1$ binomial coefficients in the row m of Yang Hui's (aka Pascal's) triangle and divide by 2^r. This gives a function which appears in probability, coding theory, information theory, and even permutation group theory. For most values of r there is no closed formula for this sum. We prove that the maximum of this function occurs (with 4 exceptions) when r equals $\lfloor m/3 \rfloor + 1$. The proof of this splits into two parts: one is easy and the other is quite difficult requiring an increasing amount of precision. The talk is not technical, and it mentions generalizations and open questions. This is joint with G.R. Paseman.

22. There are no block-transitive subspace designs

Jesse Lansdown (The University of Western Australia)

Thur 18 November 2021 14:00

Given $V \cong \mathbb{F}_d^q$ for a prime power q, a t-$(d, k, \lambda)_q$ *design* is a pair $D = (V, \mathcal{B})$ where $\mathcal{B}$ is a subset of k-spaces of V such that every t-dimensional subspace of V is contained in exactly λ elements of $\mathcal{B}$. We often refer to t-$(d, k, \lambda)_q$ designs simply as *subspace designs*. If Aut(D) acts transitively on $\mathcal{B}$, then D

is said to be *block-transitive*. We show that there are no non-trivial block-transitive subspace designs for $t \geq 2$. This stands in contrast to *block designs*, for which there are well studied block-transitive examples. This is joint work with Daniel Hawtin.

23. On kernels of relations

Marcel Jackson (La Trobe University)

Fri 19 November 2021 14:30

The kernel of a binary relation R is the relation that relates two points x, y if they are related to a common z by R; the cokernel is defined dually; these can also understood as $R \circ R^{-1}$ and $R^{-1} \circ R$ respectively, reading compositions left to right and where R^{-1} is relational converse. We show it is undecidable to determine if a semigroup with two unary operations K, C is isomorphic to a semigroup of binary relations under the operation of composition, if K is to return the kernel of a relation and C the cokernel.

24. Simple groups of homeomorphisms of Cantor space

Alejandra Garrido (Universidad Autónoma de Madrid)

Wed 17 November 2021 16:00

The group of automorphisms of an infinite locally finite graph can be profitably studied by declaring two automorphisms to be "close" to each other if their actions coincide on a ball of large radius in the graph. This results in a topology on the group, with respect to which multiplication and inversion are continuous operations. It happens that the topology is totally disconnected and locally compact. That is, the automorphism group of such a graph is a totally disconnected locally compact group. If this graph is, for instance, a regular tree, then its group of automorphisms is moreover (almost) simple and generated by a compact set.

The general theory of totally disconnected locally compact groups has advanced by leaps and bounds in recent years. Yet we are still in need of more examples of such groups that are simple, compactly generated and not discrete. As well as the group of automorphisms of a regular tree, other examples are provided by the group of almost automorphisms of the same tree. This turns out to be a piecewise full group (a.k.a. topological full group) of the Cantor space, the boundary of the tree.

After explaining the necessary background and definitions, I will report on ongoing joint work with C. Reid and D. Robertson on how to use piecewise full groups to obtain examples of compactly generated, simple, totally disconnected locally compact groups.

25. On Sylow Branching Coefficients

Eugenio Giannelli (Università degli Studi di Firenze)

Thur 18 November 2021 16:00

Let p be a prime, let G be a finite group and let P be a Sylow p-subgroup of G. Over the last couple of years I have been interested in studying the structure of the restriction to P of any irreducible character of G. More precisely, if $\chi \in \mathrm{Irr}(G)$ then the restriction χ_P decomposes into the sum of irreducible characters of P appearing with integer multipicities. These multiplicities are called Sylow Branching Coefficients (SBCs). In this talk I will present some new results concerning SBCs in the case where G is the symmetric group. Moreover, I will mention how the study of this topic allowed us to prove a Conjecture formulated by Malle and Navarro in 2012.

This talk is based on joint works with Stacey Law, Jason Long, Carolina Vallejo and Giada Volpato.

26. An algebraic tasting platter

Melissa Lee (University of Auckland)

Fri 19 November 2021 12:00

In this somewhat unconventional talk, I will be discussing a number of problems related to properties of finite groups that have piqued my interest over the past couple of years. Many involve *bases* of permutation groups $G \leq \mathrm{Sym}(\Omega)$, which are subsets $B \subseteq \Omega$ with trivial pointwise stabiliser. There will also be a few open problems along, so hopefully everyone will find something for their mind to nibble on.

Participants

Ramon Abud Alcala	Macquarie University
Jack Allsop	Monash University
Ibrahim Alotaibi	USYD
Iin Ariyanti	University of Muhammadiyah Banjarmasin
Ali Asiri	Finders University
John Bamberg	The University of Western Australia
Santiago Barrera Acevedo	Monash University
Alex Bishop	University of Sydney
Jim Byrnes	Prometheus Inc.
Max Carter	The University of Newcastle
Su Yuan Chan	Deakin University
Lei Chen	The University of Western Australia
Andrew Craig	University of Johannesburg
John Cu	University of Technology Sydney
Eden Danielsen-Jensen	University of the Sunshine Coast
Brian Davey	La Trobe University
Alex de Lacy	Monash University
Heiko Dietrich	Monash University
Dung Duong	University of Wollongong
James East	Western Sydney University
Murray Elder	University of Technology Sydney
Evelyn Gabinete	The University of Sydney
Richard Garner	Macquarie University
Alejandra Garrido	Universidad Autónoma de Madrid
Eugenio Giannelli	Università degli Studi di Firenze
Michael Giudici	The University of Western Australia
Stephen Glasby	University of Western Australia
Miroslav Haviar	Matej Bel University
Daniel Hawtin	University of Rijeka
Roozbeh Hazrat	Western Sydney University
Edmund Heng	Australian National University
Tamara Hogan	University of Melbourne
Deborah Jackson	La Trobe University
Marcel Jackson	La Trobe University
Jesse Lansdown	The University of Western Australia
Mihai-Silviu Lazorec	"Alexandru Ioan Cuza" University of Iasi, Romania
Melissa Lee	University of Auckland
Florian Lehner	Graz University of Technology
Kevin Limanta	UNSW Sydney
Pankaj Kumar Manjhi	Vinoba Bhave University, Hazaribag, India.
Luke Mathieson	University of Technology Sydney
Kerri Morgan	Deakin University
Kie Seng Nge	Australian National University
Leonard Paleta	University of Southern Mindanao
Bregje Pauwels	The University of Sydney
Adam Piggott	Australian National University
Tomasz Popiel	University of Auckland
John Power	Macquarie University
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