ABSTRACTS

Collin Bleak (St. Andrews University)

Rational embeddings of hyperbolic groups

We will describe how to realise those hyperbolic groups which act faithfully on their visual boundary as groups of homeomorphisms of a Cantor space. The realisation is particularly nice as the homeomorphisms which arise are rational in the sense of Grigorchuk, Nekrashevych, and Suschanskii (each group element can be represented by a (likely asynchronous) finite state transducer). This gives a different, and convenient, flavour of computability to hyperbolic groups, which were already known to be automatic. If time allows, we will also discuss applications of the core result. We aim to address non-initiates in these matters, but the talk will contain details hopefully of interest to experts. Joint with J. Belk and F. Matucci.

Jon González-Sánchez (Universidad del País Vasco)

Zeta function associated to representations over number fields

Let K be a number field, G an infinite group and a_n the the number of irreducible representations of G over the field K. In this talk we will discuss the zeta function associated to the sequence $(a_n)_{n\in\mathbb{N}}$ for certain families of compact p-adic groups.

Martin Kassabov (Cornell University)

Towards finite presentability of Torelli groups

I will discuss the question whether the Torelli groups are finitely presented. There is a lot of evidence suggesting that these groups are finitely presented, but even the finite generation of $H^2(T)$ is no known. I will explain a recent partial result showing that H^2 is finitely generated as $Sp(\mathbb{Z})$-module. Joint work with A. Putman.

Radha Kessar (City University London)

Categorical equivalences and Galois equivariant character bijections

Categorical equivalences between block algebras of finite groups - such as Morita and derived equivalences - induce character bijections which commute with the Galois groups of field extensions. This motivates the problem of realising Morita and derived equivalences over non splitting fields. I will present various results around this theme. This is joint work with Markus Linckelmann.

Markus Linckelmann (City University London)

Weight conjectures for fusion systems

One of the most iconic conjectures in modular representation theory is Alperin's Weight Conjecture, which expresses the number of simple modules of (blocks of) a finite group algebra in terms of 'local information', or more precisely, in terms of numerical invariants of fusion systems associated with blocks. Those numerical invariants make perfectly sense for arbitrary fusion systems (which need not arise from blocks). We explore these invariants and interaction between them as would be predicted by conjectures in modular representation theory. This is joint work with Radha Kessar, Justin Lynd, and Jason Semeraro.

Andrea Lucchini (Università di Padova)

Invariably generation of finite groups: a dangerous tempting game

A subset S of a group G invariably generates G if, when each element of S is replaced by an arbitrary conjugate, the resulting set generates G. A tempting game is the following: the generating properties of finite groups have been widely investigated. One can take a result concerning the generation of finite groups and ask whether there is an analogous statement is the context of invariably generation. This is a "dangerous" game. Even the apparently most innocence questions that arise in this way are quite often very hard to be answered. In the talk we explore some examples of this situation.

Emanuele Pacifici (Università degli Studi di Milano)

On the character degree graph of finite groups

Character Theory is one of the fundamental tools in the theory of finite groups, and, given a finite group G, the study of the set $\mathrm{cd}(G) = \{\chi(1) \mid \chi \in \mathrm{Irr}(G)\}$, of all degrees of the irreducible complex characters of G, is a particularly intriguing aspect of this theory. One of the methods that have been devised to approach such degree-set is to consider the *prime graph* $\Delta(G)$ attached to it.

The character degree graph $\Delta(G)$ is thus defined as the (simple undirected) graph whose vertex set is the set of all the prime numbers that divide some $\chi(1) \in \mathrm{cd}(G)$, while a pair $\{p, q\}$ of distinct vertices p and q belongs to the edge set if and only if pq divides an element in $\mathrm{cd}(G)$.

There is a well-developed literature on character degree graphs (see for instance the survey [3], and also [1], [2]). A large part of it is focused on studying to which extent specific properties of a group are reflected by graph theoretical features of its graph, or aimed at describing in detail the degree graph of interesting classes of groups.

In this talk, we will discuss some recent developments in this research area (joint works with Z. Akhlaghi, C. Casolo, S. Dolfi, L. Sanus).

References

[1] Z. Akhlaghi, C. Casolo, S. Dolfi, K. Khedri, E. Pacifici, *On the character degree graph of solvable groups*, Proc. Amer. Math. Soc. 46 (2018), 1505–1513.

[2] C. Casolo. S. Dolfi, E. Pacifici, L. Sanus, *Groups whose character degree graph has diameter three*, Israel J. Math. 215 (2016), 523–558.

[3] M. Lewis, *An overview of graphs associated with character degrees and conjugacy class sizes in finite groups*, Rocky Mountain J. Math. 38 (2008), 175–211.