Workshop on the Hanna Neumann Conjecture

Bilbao, June 28th- July 10th

Contríbuted Talks

Federico Berlai (University of Vienna)
Title: Graph products of residually amenable groups

Abstract: Graph products of groups are strictly related to right-angled Artin groups (RAAGs), and they generalise direct and free products in the same way as RAAGs generalise free abelian and free groups. Properties that are stable under direct and free products are often inherited by graph products too. Examples are residual finiteness, conjugacy separability, soficity, or the Haagerup property.

We present some sufficient conditions implying that a class of groups C is closed under taking graph products. This method recovers all the known results concerning residual properties of graph products. Moreover, it allows one to conclude that the classes of residually amenable, residually elementary amenable or residually solvable groups are closed under such construction.

This is joint work with Michal Ferov, and it is supported by the ERC grant of Prof. Goulnara Arzhantseva "ANALYTIC" no. 259527.

Pep Burillo (Universitat Politècnica de Catalunya)
Title:Generalizations of Grigorchuk's group

Abstract: In this talk we will show some work in progress on finding generalizations of Grigorchuk's first group to an arbitrary number of generators. We will construct these generalizations, show that they also have intermediate growth, and that they are pairwise non-isomorphic. This is joint work with Aitor Pérez.

Michal Ferov (University of Southampton)
Title: On conjugacy separability of graph products of groups

Abstract: We show that the class of C-hereditarily conjugacy separable groups is closed under taking arbitrary graph products whenever the class C is an extension closed variety of finite groups. As a consequence we show that the class of C-conjugacy separable groups is closed under taking graph products. In particular, we show that right angled Coxeter groups are hereditarily conjugacy separable and 2-hereditarily conjugacy separable, and we show that infinitely generated right angled Artin groups are hereditarily conjugacy separable and p-hereditarily conjugacy separable for every prime number p.

Armando Martino (University of Southampton)
Title: The degree of commutativity in groups

Abstract: We introduce a measure of the extent to which a discrete group has many elements which commute. More precisely, in a discrete group, we may count the number of pairs of elements in the ball of radius n which commute, and register the proportion of these amongst all possible pairs in the same ball. Taking a limit (or lim sup) of these numbers provides us with a measure, which we call the degree of commutativity, of how likely it is that a random pair of elements in a group commute. Our results then rely on various technical hypotheses which largely confirm the intuition that the degree of commutativity is positive if and only if the group is virtually abelian, although we do not prove this in complete generality. This is joint work with Yago Antolin and Enric Ventura.

David Robertson (University of Newcastle)
Title:Conjugacy in Higman-Thompson groups

Abstract: In 1960, Richard Thompson introduced three groups called F, T and V. Graham Higman generalised these to three infinite families $F_{n,r}$, $T_{n,r}$ and $V_{n,r}$. His 1974 paper showed that each was finitely presented and infinite, and that $V_{n,r}$ is simple when n is even.

Higman also explained how to solve the conjugacy problem in $V_{n,r}$. In his 2015 thesis, Nathan Barker extended this to tackle the power conjugacy problem. I've been implementing all this in a Python package called `thompson'.

In this talk I'll introduce the world of Thompson's groups and try to give some idea why people find them interesting. Next I'll try to explain the ideas behind Higman's algorithm. To finish, I'l try to give a quick demonstration of `thompson' and discuss future work on these groups.

Jone Uria (Universidad del País Vasco/Euskal Herriko Unibertsitatea)
Title:Congruence Subgroup Property for GGS groups and some generalisations

Abstract:The GGS groups, named after Grigorchuk, Gupta and Sidki, are a family of subgroups of automorphisms of the p-adic tree T. In this talk, we define the Congruence Subgroup Problem (CSP) for subgroups of AutT and we solve it for these groups GGS. We also point out some generalisations and related questions.

Jianchun Wu (Universitat Politècnica de Catalunya)
Title:Fixed subgroups are compressed in surface groups.

Abstract: For a compact surface Σ (orientable or not, and with boundary or not) we show that the fixed subgroup, Fix(B), of any family B of endomorphisms of $\pi_1(\Sigma)$ is compressed in $\pi_1(\Sigma)$ i.e., $rk(Fix(B)) \leq rk(H)$ for any subgroup $Fix(B) \leq H \leq \pi_1(\Sigma)$. On the way, we give a partial positive solution to the inertia conjecture, both for free and for surface groups. We also investigate direct products, G, of finitely many free and surface groups, and give a characterization of when G satisfies that $rk(Fix \phi) \leq rk(G)$ for every $\phi \in Aut(G)$.

Alexander Zakharov (Universidad del País Vasco/Euskal Herriko Unibertsitatea)
Title: Intersecting subgroups in fundamental groups of graphs of groups

Abstract: Suppose G is the fundamental group of a finite graph of groups with finite edge groups, and H and K are subgroups of G which intersect trivially with the conjugates to the edge groups. Suppose also H and K have finite Kurosh ranks. We prove an estimate of the Hanna Neumann type for the Kurosh rank of the intersection of H and K. We get immediate corollaries for amalgamated free products and HNN-extensions. This is joint work with Sergei Ivanov.