
Geometric Group Theory
Théorie géométrique des groupes

(Org: **Adam Clay** (University of Manitoba), **Eduardo Martinez Pedroza** (Memorial University) and/et **Nicholas Touikan** (University of New Brunswick))

ADAM CLAY, University of Manitoba

Borel complexity and isomorphism of bi-orderable groups

In this talk I will give an introduction to classification problems from the perspective of descriptive set theory, and describe a recent result with Filippo Calderoni that shows classifying finitely generated bi-orderable groups is conjecturally as infeasible as classifying all finitely generated groups.

TYRONE GHASWALA, University of Waterloo

Promoting circular orderability to left orderability

Under what conditions does a group that acts on the circle also act on the line? This seemingly innocent question leads to some surprising mathematics!

I will talk about necessary and sufficient conditions for a circularly orderable group to be left-orderable, and introduce the obstruction spectrum of a circularly orderable group. This joint work with Jason Bell and Adam Clay raises a plethora of intriguing open questions.

HAOYANG HE, Memorial University of Newfoundland

The curve complex as a coset intersection complex

I will talk about the relationship between the curve complex and a coset intersection complex associated to the mapping class group. In particular, the two complexes are combinatorially equivalent, quasi-isometric, and homotopy equivalent. Moreover, this combinatorial equivalence implies that the automorphism group of the coset intersection complex is the extended mapping class group.

EDUARDO MARTÍNEZ-PEDROZA, Memorial University of Newfoundland

JEAN PIERRE MUTANGUHA, McGill University

Bounded dynamics in various moduli spaces

For any compact hyperbolic 3-manifold M with boundary, Thurston defined the skinning map: a self-map of the Teichmüller space for the boundary of M . For any postcritically finite branched cover of the 2-sphere, Thurston defined the pullback map: a self-map of the Teichmüller space of the 2-sphere relative to the postcritical set. For any injective endomorphism of a finitely generated free group, there is a semi-action on (i.e. self-map of) the corresponding outer space. In each of these three cases, the existence of a fixed point for the self-maps was a key component of a broader program. Beyond the existence of a fixed point, I would like to characterise exactly when these self-maps have bounded dynamics; moreover, it seems that there might be an underlying principle unifying the seemingly disparate dynamical systems. I will discuss recent results and the open question that interests me.

CATHERINE PFAFF, Queens University

NICHOLAS TOUKIAN, University of New Brunswick (Fredericton)

On the dual of commensurability and virtual embeddings into direct products

Groups G_1, G_2 are commensurable if there is a third group H that embeds as a finite index subgroup in G_1 and G_2 . We can "reverse the arrows" and declare G_1, G_2 to be co-commensurable if they both embed as finite index subgroups of a common overgroup. Co-commensurability implies commensurability. An exploration of the methods to construct common finite covers of graphs led me to an exploration of when a commensuration can be induced by a co-commensuration. In this presentation I will cover the motivating problem as well as the solution to the problem of when a commensuration can be completed to a co-commensuration. I will then discuss the unexpected contribution of Ashot Minasyan who saw that my ideas had implications towards virtual embeddings of groups into direct products.

DIANA VIZCAINO, Memorial University of Newfoundland

Finiteness of Homological Dehn Functions

We partially address a question from S. Bader, R. Kropholler, and V. Vankov regarding the finiteness of homological n -isoperimetric functions over a ring R for groups, as defined in their work. Let R denote the field \mathbb{Q} , \mathbb{R} , or \mathbb{C} with the absolute value norm. We prove that for any group G that admits an $(n + 1)$ -dimensional cocompact model for \underline{EG} , the homological n -isoperimetric function of G over R is either linear or takes infinite values, which follows as a more general result which we will discuss in this talk. In particular, by results of Gersten and Mineyev, in this class of groups, the homological 1-isoperimetric function over R only captures hyperbolicity. This is joint work with Eduardo Martínez-Pedroza.