Journée scientifique de l'IMB

1 avril 2019

10h-11h Maria Cumplido Cabello : *Conjugacy stability of standard parabolic subgroups of Artin groups of spherical type*

Résumé : Given a group G together with a proper subgroup $H < G$, we say that H is conjugacy stable in G if the following condition holds, for every $a, b \in H$:

$$\exists \, c \in G, \; c^{-1}ac = b \Longrightarrow \exists c' \in H, \; c'^{-1}ac' = b.$$

Let A be an Artin-Tits group with a set of generators Σ. A standard parabolic subgroup A_X is a subgroup generated by any $X \subseteq \Sigma$.

We say that A_X is irreducible if it cannot be decomposed as a non-trivial direct product of standard parabolic subgroups.

We say that any conjugate of a irreducible standard parabolic subgroup is an irreducible parabolic subgroup.

In this talk we will see that most irreducible parabolic subgroups of Artin-Tits groups of spherical type are conjugacy stable and give a list of the failing cases. This answers a question by Ivan Marin and generalizes a theorem obtained by González-Meneses in the specific case of braid groups. (joint work with Matthieu Calvez and Bruno Cisneros de la Cruz.)

11h-12h Franz Chouly : *Une méthode numérique explicite en temps pour le contact dynamique*

Résumé : Les schémas d'intégration en temps explicites connaissent un regain d'intérêt en dynamique des structures en raison de certaines propriétés attractives (parallélisation massive par exemple). Leur adaptation pour des problèmes de contact pose néanmoins des difficultés en terme de précision et de robustesse. Nous présenterons dans cet exposé une méthode basée sur une discrétisation de type Nitsche pour le contact, et le schéma d'intégration en temps de Verlet. Nous montrerons des résultats partiels de stabilité ainsi que des résultats numériques obtenus avec la librairie éléments finis GetFEM++, où la méthode sera comparée aux techniques existantes. Ce travail est une collaboration avec Yves Renard (Institut Camille Jordan, LaMCoS, INSA Lyon).

14h-15h Delphine Moussard : *Homological invariants of 4-manifolds from trisection diagrams*

Résumé : Gay and Kirby proved in 2012 that any smooth closed oriented 4-manifold can be trisected into three 4-dimensional handlebodies with 3-dimensional handlebodies as pairwise intersections and a closed surface as setwise intersection. Such a trisection can be represented by a trisection diagram given by the mentioned closed surface with three families of curves that are systems of meridians for the mentioned 3-dimensional handlebodies. After recalling the analogous notion of Heegaard splitting of 3-dimensional manifolds and introduced the trisections, we will see how to compute the homology and the intersection form of a 4–manifold from a trisection diagram. We will also mention the twisted homology and the Reidemeister torsion. This is a joint work with Vincent Florens.

15h-16h Gopalakrishna Murty Kappagantula : *Enumeration of N-rooted maps using QFT*

Résumé : Enumeration of rooted ribbon graphs started with the work by Tutte in the 1960's. We call such graphs one-rooted graphs and introduce a notion of more general N-rooted ribbon graphs. This definition is motivated by the bijective correspondence we establish between the N-rooted ribbon graphs with e edges and the (e-N+1)-loop Feynman diagrams of a certain quantum field theory. This result is used to obtain explicit expressions and relations for the generating functions of N-rooted maps and for the numbers of N-rooted maps with a given number of edges using the path integral approach applied to the corresponding quantum field theory. This is a joint work with Vasilisa Shramchenko and Patrick Labell.