Adam Mickiewicz University
Faculty of Mathematics and Computer Science

GEOMETRY AND TOPOLOGY SEMINAR

11 AM, Friday, April 28, 2017
B1-37, Collegium Mathematicum

Speaker: David Méndez (University of Malaga)

Title: Homotopically rigid Sullivan algebras and their applications

Abstract:

The group of homotopy self-equivalences of a space is rarely trivial. Kahn was the first to obtain an example of one such space with non-trivial rational homology in the seventies. Later, Arkowitz and Lupton came across an example of a Sullivan algebra (equivalently, a rational homotopy type) with trivial homotopy self-equivalences. This algebra was used by Costoya and Viruel to solve Kahn's group realisability problem for finite groups, thus obtaining for any finite group G a rational space X whose group of homotopy self-equivalences is isomorphic to G. This construction also provide a way to obtain an infinite amount of homotopically rigid spaces. However, they all share their level of connectivity with the example of Arkowitz and Lupton.

The objective of this work is to illustrate that:

(1) Homotopically rigid spaces are not as rare as they were though to be. We are able to obtain an infinite family of homotopically rigid spaces, showing a level of connectivity as high as desired.

(2) Building blocks other than the example of Arkowitz and Lupton can be used to solve Kahn's realisability problem.

We can also apply the obtained results to differential geometry by enlarging the class of inflexible manifolds existing in literature and building new examples of strongly chiral manifolds.

References: C. Costoya, D. Méndez, A. Viruel, *Homotopically rigid Sullivan algebras and their applications*, arXiv:1701.03705 [math.AT].