DEPARTAMENTO DE
GEOMETRIA Y TOPOLOGIA

Instituto de
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Interdisciplinar

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Introduction to Coarse Geometry and Asymptotic dimension

Coarse Geometry/Topology is a way of looking at objects that corresponds to 'zooming out' in computer science. In that sense 'zooming in' corresponds to classical differential geometry.

After a brief introduction to the subject, I will discuss an aspect of large scale geometry, namely asymptotic dimension of Gromov and its variants (Nagata-Assouad dimension, Higson property). A connection to geometric group theory will be mentioned. Asymptotic dimension of Gromov is a large scale analog of the covering dimension. In case of a initely generated group G the asymptotic dimension does not depend on the word metric. Therefore it is a group invariant.

Asymptotic dimension gained attention since G.Yu proved the Strong Novikov Conjecture for finitely presented groups G of finite asdim(G) (and gave a talk at ICM in Madrid two years ago). The Novikov conjecture concerns the homotopy invariance of certain polynomials in the Pontryagin classes of a manifold, arising from the fundamental group. According to the Novikov conjecture, the higher signatures, which are certain numerical invariants of smooth manifolds, are homotopy invariants. The Strong Novikov conjecture states that the analytic assembly map on K-theory is injective.

The talk is aimed at non-specialists and graduate students.

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