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Paris 7

"Geometry and analysis on groups"

La Sapienza, Roma

We will present aspects of asymptotic group theory related to analysis and geometry. We plan to explain classical problems as well as recent developments motivated by computer science and operator algebras.

The following problems will be discussed in detail:

- Burnside problem - infinite torsion groups
- Milnor problem - intermediate growth groups
- Day problem - exotic amenable groups
- Siegel problem - finite generation of lattices
- Atiyah problem - L^2 Betti numbers of closed manifolds
- Margulis construction of expanders
- Gromov problem - uniform exponential growth

The following topics constitute the plan of the class:

- Automata groups
- Amenability and property (T)
- Random groups and random graphs
- L^2 invariants of groups and manifolds
- Random walks on groups and graphs