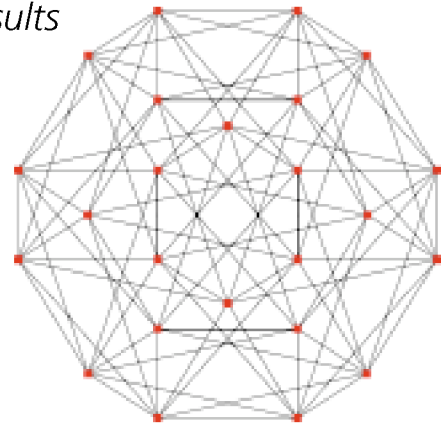


The Oliver Club

www.math.cornell.edu/~oliver/

A New Proof of Gromov's Theorem on Groups of Polynomial Growth

In 1981 Gromov showed that any finitely generated group of polynomial growth contains a finite index nilpotent subgroup. This was a landmark paper in several respects. The proof was based on the idea that one can take a sequence of rescalings of an infinite group G , pass to a limiting metric space, and apply deep results about the structure of locally compact groups to draw conclusions about the original group G . In the process, the paper introduced Gromov-Hausdorff convergence, initiated the subject of geometric group theory, and gave the first application of the Montgomery-Zippin solution to Hilbert's fifth problem (and subsequent extensions due to Yamabe).



The purpose of the lecture is to give a new, much shorter, proof of Gromov's theorem. The main step involves showing that any infinite group of polynomial growth admits a finite dimensional linear representation with infinite image. We establish this using harmonic maps, thereby avoiding the Montgomery-Zippin-Yamabe theory of locally compact groups which was used in Gromov's original proof.

Bruce Kleiner

Yale University

Refreshments will be served at 3:55 PM in the Mathematics Department lounge (532 Malott Hall).

Thursday, April 10, 2008

at 4:25 PM in 406 Malott Hall