FALL 2015

MATH 595

Expander Graphs in Number Theory

Section EG, CRN 64466

3-3:50 PM MWF, 441 Altgeld Hall

Elena Fuchs

Course description: This course will explore various aspects of expander graphs, with a view towards applications in number theory, specifically that of the Affine Sieve developed by Bourgain-Gamburd-Sarnak in 2009. We will give three definitions of expander graphs and show that they are equivalent, we will then explore the application of expander graphs in the Affine Sieve, and, finally, we will prove that certain concrete graphs (obtained as Cayley graphs of certain finitely generated subgroups of SL_n(Z)) are indeed expanders. This last point has a long history and will take up a large part of the course. Prerequisites are minimal: a knowledge of linear algebra and the group theory part of a first semester graduate algebra course will suffice.

Text: No text required.