Expander Graphs and Automorphic Forms

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102 Bradley Hall, 4:00 pm
(Tea 3:30 pm Math Lounge)

Abstract

Expander graphs are useful in a variety of ways: they play an important role in the design of sorting algorithms, are used in the construction of nonblocking connectors and superconcentrators, etc. The problem of finding good expanders is essentially one of constructing regular graphs with small second largest eigenvalue.

In this talk we will use the theory of automorphic forms to construct an infinite family of "very good" expander graphs — Ramanujan type graphs. Our objects will be quotients of the Bruhat-Tits building associated with the group $SL_3(\mathbb{Q}_p)$. Ramanujan graphs have been introduced by Lubotzky, Phillips and Sarnak in the late '80s and they are the best known expanders.

This talk should be accessible to graduate students.