Temple University Mathematics Colloquium

Uzi Vishne
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will speak on

Isospectral manifolds and Cayley graphs

ABSTRACT: In his famous paper from 1966, M. Kac asks "Can you hear the shape of a drum?"; namely – can a compact manifold be determined from the spectrum of its Laplacian? The answer turned out to be negative: various constructions of isospectral non-isomorphic surfaces were discovered by M.F. Vigneras, T. Sunada and others. However, in all these constructions, the pairs of manifolds are commensurable (namely they have a finite common cover). This raises a natural question: can you hear the shape of a drum at least roughly, that is, up to commensurability?

I will present a construction of families of isospectral non-commensurable manifolds in dimension $d > 2$. Time permitting, I will also explain how a positive-characteristic analogue of these techniques provides isospectral non-commensurable finite complexes, and isospectral non-isomorphic Cayley graphs of finite simple groups.

This is a joint work with A. Lubotzky and B. Samuels.

Monday, March 20, 2006
Lecture at 4:00 pm (♯)
Coffee, tea, and refreshments from 3-5 pm
Room 617, Wachman Building
Department of Mathematics