Spectral asymptotics for the Laplacian and lattice point counting

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

Abstract

Let (M, g) be a compact Riemann manifold and $-\Delta$ its Laplace-Beltrami operator. The spectral counting function, $N(\lambda)$, counts (with multiplicities) the number of Laplace eigenvalues less than λ. The Weyl formula states that to leading order:

$$N(\lambda) \sim_{\lambda \to \infty} c\lambda^{n/2}.$$

We will review some known results concerning the error term $R(\lambda) := N(\lambda) - c\lambda^{n/2}$ and then discuss recent work (joint with Y. Petridis) on bounds for $R(\lambda)$ in the case of a flat torus or a Heisenberg manifold. In these cases, asymptotics for $N(\lambda)$ can be reduced to certain lattice point counting problems.

This talk should be accessible to undergraduates.

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