

BI-CO MATHEMATICS COLLOQUIUM

Katherine Okikiolu
UC – San Diego
&
University of Pennsylvania

“Spectral zeta functions and Sobolev-type inequalities on manifolds”

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Talk at 4:15 – Park 328
Tea at 3:45 – Park 355, Math Lounge

Abstract: The (positive) Laplace-Beltrami operator on a closed compact Riemannian manifold with metric g has a sequence of non-negative eigenvalues $0 = \lambda_1 \leq \lambda_2 \leq \dots$ tending to infinity. The spectral zeta function

$$Z(g,s) = \lambda_1^{-s} + \lambda_2^{-s} + \dots$$

converges for the real part of s sufficiently large, and analytically continues to a meromorphic function of s . One can fix s and try to understand how $Z(g,s)$ depends on the metric g . Similarly one can consider the residue of $Z(g,s)$ at a pole, or the s -derivative of $Z(g,s)$ at a given value of s . For example, the Yamabe functional and the log-determinant of the Laplacian are functionals of the metric that occur in this way.

In this lecture we discuss some recent work on the behavior of the trace of the inverse of the Laplacian on surfaces, which gives rise to sharp Logarithmic Hardy Littlewood Sobolev and Onofri inequalities for tori. We put this in the context of previous results on zeta invariants.

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