Geometry–Topology Seminar

Ara Basmajian

Graduate Center and Hunter College, CUNY

will speak on

Length bounds for self-intersecting geodesics

ABSTRACT: We consider the relationship between self-intersection number of a closed geodesic and its length. For brevity, we call a closed geodesic with self-intersection number k, a *k-geodesic*. For k a natural number and S a hyperbolic surface, define

- $m_k = m_k(S) = \inf\{\ell(\omega) : \omega \text{ is a } k\text{-geodesic on } S\}$, and
- $M_k = \inf\{\ell(\omega) : \omega \text{ is a } k\text{-geodesic on } Y, \text{ for some hyperbolic surface } Y\}$.

The constants M_k are universal, whereas the m_k depend on the hyperbolic surface S. We are interested in the growth rates of the sequences $\{m_k\}$ and $\{M_k\}$, as $k \to \infty$.

Theorem 1

1. *If S is a compact hyperbolic surface with (possibly empty) geodesic boundary, then $m_k = \Theta(\sqrt{k})$.*
2. *If S is a hyperbolic surface with non-abelian fundamental group and at least one cusp then $m_k = \Theta(\log(k))$.*
3. *$M_k = \Theta((\log(k))$.*

The Θ-notation above means that the ratio of the functions is bounded from above and below. In this talk we will give a more precise version of the theorem above as well as indicate the ideas of the proof.

Tuesday, 9 February 2010
Lecture at 3:30 pm
Room 617, Wachman Building
Department of Mathematics