Rafael Ruggiero
????

Large deviations and Mather measures for expansive, nonhyperbolic geodesic flows

(joint work with A. Lopes)

Abstract

Let (M, g) be a compact surface whose curvature is nonpositive such that

1. There is a closed geodesic γ where $K \equiv 0$ whose orbit supports the (unique) Mather measure of $H(p, v) = \frac{1}{2} g_p(v, v) - \omega_p(v)$.
2. $K < 0$ in the complement of γ.
3. There exists $m > 0$ such that for every geodesic $\beta : (-\epsilon, -\epsilon) \longrightarrow M$ perpendicular to γ at $\beta(0) = \beta \cap \gamma$ we have that m is the least integer where $\frac{\partial^m}{dt^m} K(\beta(t))|_{t=0} \neq 0$.

Then we apply a result of N. Anantharaman to find a deviation function for the stationary measures of the Brownian motions associated to the twisted hamiltonians $H_{\omega,\lambda}(p, v) = \frac{1}{2} g_p(v, v) - \lambda\omega(v)$, where $\lambda \to +\infty$). The deviation function is a polynomial function with power $2 + \frac{m}{2}$, much worse (as expected) than the linearity obtained for hyperbolic closed geodesics. The formula is a counterpart of well known deviation functions in one dimensional dynamics with neutral fixed points.