
SAGUN CHANILLO, Rutgers University
Local Version of Courant's Nodal Domain Theorem

Given a compact Riemannian manifold with no boundary (M^n, g) endowed with a smooth metric g , one of the important objects of study is the Laplace-Beltrami operator and its eigenfunctions. That is

$$-\Delta u_k = \lambda_k u_k.$$

The Courant nodal domain theorem asserts that the k -th eigenfunction has at most k nodal domains, where a nodal domain is a connected component of the set $\{x \mid u_k(x) \neq 0\}$. Harold Donnelly and C. Fefferman initiated the study of local versions of this result with a goal to show that nodal domains cannot be long and narrow. This was related to a conjecture of S.-T. Yau on the length of the nodal set. The nodal set is the set $\{x \mid u_k(x) = 0\}$. In this joint work with A. Logunov, E. Mallinikova and D. Mangoubi, we obtain an optimal bound for results of this type.