CHARACTERIZATION OF CHORD-ARC DOMAINS VIA PERTURBATION OF ELLIPTIC OPERATORS

José María Martell
ICMAT (Spain)
chema.martell@icmat.es

Abstract

Let $\Omega \subset \mathbb{R}^{n+1}$, $n \geq 2$, be a 1-sided chord-arc domain, that is, a domain which satisfies interior Corkscrew and Harnack Chain conditions (these are respectively scale-invariant/quantitative versions of the openness and path-connectedness), and whose boundary $\partial \Omega$ is $n$-dimensional Ahlfors regular. In a recent result together with S. Hofmann and T. Toro we have shown that for a reasonably good elliptic operator $L$, the $A_\infty$ property of the associated harmonic measure implies that the domain is indeed a chord-arc domain, that is, it satisfies the exterior Corkscrew condition. The fact that in chord-arc domains the class of operators considered have $A_\infty$ elliptic measures was shown by Kenig-Pipher. Hence, combining both results one gets a characterization of the exterior Corkscrew condition (which is geometrical/topological) in terms of the $A_\infty$ property (which is analytical/PDE).

In this talk we will extend the class of good operators, allowing for instance non-smooth coefficients, using perturbation techniques, which extend previous work by Fefferman-Kenig-Pipher and Milakis-Pipher-Toro. More precisely, let $L_0$ and $L$ be two real divergence form elliptic operators and let $\omega_{L_0}$, $\omega_L$ be the associated elliptic measures. We show that if $\omega_{L_0} \in A_\infty(\sigma)$, where $\sigma = H^n|\partial \Omega$, and $L$ is a perturbation of $L_0$ (in the sense that discrepancy between $L_0$ and $L$ satisfies certain Carleson measure condition), then $\omega_L \in A_\infty(\sigma)$.

Joint work with J. Cavero, S. Hofmann and T. Toro.