

Positive harmonic functions on Denjoy-type domains

Joanna Pres

(University College Dublin, Dublin, Ireland)

This talk concerns the study of positive harmonic functions on a particular type of unbounded domain.

Let E be a closed set in the hyperplane $\mathbb{R}^{N-1} \times \{0\}$ of Euclidean space $\mathbb{R}^N$ with $N \geq 2$. A domain of the form $\Omega = \mathbb{R}^N \setminus E$ is called a *Denjoy domain*. Benedicks studied the cone of positive harmonic functions in a Denjoy domain vanishing continuously on the boundary. He gave an integral criterion in terms of harmonic measure which characterizes when there is a positive harmonic function h on Ω satisfying $h(x) \geq x_N$. Later, Cranston and Salisbury obtained a corresponding result in the case of the plane where E lies on n rays leaving the origin.

Suppose now that E is a closed subset of the boundary of an infinite cylinder U in $\mathbb{R}^N$ ($N \geq 2$). In this talk a Benedicks-type criterion will be provided for the existence of a positive harmonic function u on Ω of exponential growth in U vanishing continuously on the boundary. An application will be given in relation to recent work of Gardiner and Hansen.

This is joint work with Marius Ghergu.