

Rectifiability and Harmonic Measure

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ABSTRACT

This dissertation is concerned with the interplay of the geometry of the boundary of a given domain (or open set) and its harmonic measure. First, we prove structure theorems for uniformly rectifiable sets. These structure theorems yield information about harmonic measure. Then we turn our attention to sets that are merely rectifiable. We show that under some mild hypotheses, if the boundary of a domain is rectifiable then surface measure is absolutely continuous with respect to harmonic measure. Finally, we explore the other direction of the connection between geometry of the boundary and harmonic measure. We show that (under certain background hypotheses) weak regularity of the Poisson kernel on both sides of a domain yields the same regularity for the unit outer normal to the domain.