

RECTIFIABILITY IS NECESSARY AND SUFFICIENT

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We shall discuss optimal conditions on the geometry of the domain responsible for solvability of the Dirichlet problem, or absolute continuity of the harmonic measure with respect to the Lebesgue measure. In rough terms, the question is: do Brownian travelers see pieces of the boundary of the domain according to their Lebesgue size, or, if not, what do they see? In 1916 F. and M. Riesz proved that in a simply connected planar domain rectifiability is sufficient, and over the years this result has been extended to higher dimensions. The centerpoint of our discussion will be a recently proved converse to F. & M. Riesz' theorem: rectifiability is also necessary for the absolute continuity of the harmonic measure with respect to the Lebesgue measure for $n - 1$ dimensional sets in R^n . We shall also touch upon a more general setting of domains with lower dimensional boundaries.