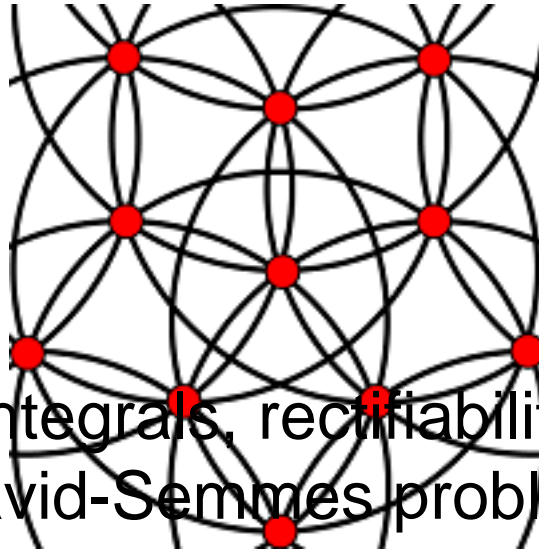


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Singular integrals, rectifiability, and the David-Semmes problem

Content :

The notion of rectifiability plays an essential role in the L^2 boundedness of some important operators arising in complex and harmonic analysis, such as the Cauchy and Riesz transforms. Indeed, by a well known result of David, it turns out that the Cauchy transform originates an operator bounded in L^2 with respect to the arc length measure on (AD regular) rectifiable curves of the plane. In the converse direction, the L^2 boundedness of the Cauchy transform with respect to arc length on a set E implies the rectifiability of E .

In this talk I will report on analogous results concerning the n -dimensional Riesz transform in \mathbb{R}^{n+1} which are due to Nazarov, Tolosa and Volberg. These results have applications to the characterization of the removable singularities for Lipschitz harmonic functions in \mathbb{R}^{n+1} .

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