1063-46-71 **Svitlana Mayboroda*** (svitlana@math.purdue.edu) and **Alexander Volberg**. *Square function, Riesz transform and rectifiability.*

We shall discuss connections between the analytic and geometric descriptions of sets. A celebrated 1991 theorem of David and Semmes ascertains that the L^2-boundedness of all Calderón-Zygmund operators with respect to a Hausdorff measure H^s on a set E implies that s is an integer and E is rectifiable ("contains big pieces of Lipschitz graphs"). In the present work the authors establish that it is, in fact, sufficient to assume pointwise boundedness of a single operator, namely, the square function associated to the Riesz transform, in order to arrive to the same conclusion. (Received August 04, 2010)