

On Rubio de Francia square function

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By *Rubio de Francia square function* we denote the square function formed by frequency projections on a collection of disjoint arbitrary intervals of the real line. J. L. Rubio de Francia established in 1985 the corresponding weighted boundedness with $A_{p/2}$ weights, when $p > 2$. The validity of the A_1 -weighted L^2 -estimate was conjectured by Rubio de Francia, but the problem remains open in full generality.

We will survey historical evolution of results on the topic and we will also show recent approaches based on time-frequency analysis and sparse domination. These new strategies have led to a better quantitative understanding of the problem, and to verify the conjecture for radially decreasing even A_1 weights and in full generality for the Walsh group analogue of Rubio de Francia square function.

In particular, the talk reports various contributions jointly with Rahul Garg and Saurabh Shrivastava, and with Francesco Di Plinio, Mikel Flórez-Amatriain and Ioannis Parisis.