Two Weight Inequalities for Singular Integrals: Recent Progress

Michael Lacey

Georgia Institute of Technology
Atlanta, USA

We survey recent results concerning the norm inequality

$$\int H(\sigma f)^2 \, \omega(dx) \leqslant C \int f^2 \, \sigma(dx)$$

where H is, say, the Hilbert transform, and ω, σ are a pair of locally finite non-negative measures. Such inequalities arise in a variety of settings, and have been studied in particular and general settings intensively by a range of people, with innovative work being done by Nazarov, Treil and Volberg over the last 15 years. We survey recent results and techniques on these questions, including new sufficient conditions for the two weight inequality above, and new results when the pair of weights arise from one in the Muckenhoupt–Wheeden class A_2.

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