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Two weight norm inequalities for singular and fractional integral operators in $\mathbb{R}^n$

I will give an overview of the history and some applications, and report on some of the recent progress on the two weight problem for singular integral operators in $\mathbb{R}^n$. In particular, I will elaborate on the original Nazarov-Treil-Volberg conjecture, its proof for the Hilbert transform, partial results for other Calderón-Zygmund operators in higher dimensions, necessity (or lack thereof) of various conditions, extensions to Tb theorems, stability results of bump conditions vs testing conditions, etc.). The talk refers to joint works with Alexis, Grigoriadis, Lacey, Luna-Garcia, Paparizos, Sawyer, and Shen.