NEW LOCAL $T1$ THEOREMS ON NON-HOMOGENEOUS SPACES

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Abstract: We develop new local $T1$ theorems to characterize Calderón–Zygmund operators that extend boundedly or compactly on $L^p(\mathbb{R}^n, \mu)$, with μ a measure of power growth.

The results, whose proofs do not require random grids, have weaker hypotheses than previously known local $T1$ theorems since they only require a countable collection of testing functions. Moreover, a further extension of this work allows the use of testing functions supported on cubes of different dimensions.

As a corollary, we describe the measures μ of the complex plane for which the Cauchy integral defines a compact operator on $L^p(\mathbb{C}, \mu)$.