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

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Key words: Calderón–Zygmund operator, compact operator, non-doubling Radon measures, Cauchy integral.