

1166-42-91

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Wavelet Representation of Singular Integral Operators, II.

We describe a new representation technique for one and multiple parameter singular integrals in terms of continuous model operators. Unlike the well-established dyadic counterpart, our representation reflects the additional kernel smoothness of the operator being analyzed. Our representation formulas lead naturally to a new family of $T(1)$ theorems on weighted Sobolev spaces whose smoothness index is naturally related to kernel smoothness. I will focus on the bi-parametric setting, where we obtain quantitative A_p estimates which are best known, and sharp in the range $\max\{p, p'\} \geq 3$. These estimates are beyond the reach of current dyadic methods. (Received February 14, 2021)