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$\ell^p(\mathbf{Z}^d)$ boundedness for discrete operators of Radon types: maximal and variational estimates.

Abstract:

In recent times – particularly the last two decades – discrete analogues in harmonic analysis have gone through a period of considerable changes and developments. This is due in part to Bourgain's pointwise ergodic theorem for the squares on $L^p(X,\mu)$ for any $p>1$. The main aim of this talk is to discuss recent developments in discrete harmonic analysis. We will be mainly concerned with $\ell^p(\mathbf{Z}^d)$ estimates ($p>1$) of r-variations ($r>2$) for discrete averaging operators and singular integral operators along polynomial mappings. All the results are subjects of the ongoing projects with Elias M. Stein and Bartosz Trojan.