1163-35-459 **Tadele Mengesha*** (mengesha@utk.edu), Then University of Tennessee, Knoxville.

Calderon-Zygmund type estimates for nonlocal PDE with Holder continuous kernel.

In this talk I will present a result on L^p-regularity of weak solutions to linear nonlocal equation. To be precise, we study solutions of $\mathcal{L}^s_K u = f$ where the nonlocal operator is given by $\mathcal{L}^s_K u(x) = -\int_{\mathbb{R}^n} K(x,y)\frac{u(x)-u(y)}{|x-y|^{n+2s}}\, dy$. We prove that for $s\in(0,1)$, $t\in[s,2s]$, $p\in[2,\infty)$, K an elliptic, symmetric, and $K(\cdot,y)$ is *uniformly Hölder continuous*, the solution u belongs to $H^{2s-t,p}_{loc}(\Omega)$ as long as $2s-t<1$ and $f\in\left\{H^{t,p'}_{loc}(\mathbb{R}^d)\right\}^*$. The increase in differentiability and integrability is independent of the Hölder coefficient of K. For example, in the event that $f\in L^p_{loc}$, we can deduce that the solution $u\in H^{2s-\delta,p}_{loc}$ for any $\delta\in(0,s]$ as long as $2s-\delta<1$. The proof uses a perturbation argument where regularity of solutions of a simpler equation is systematically used to obtained a desired estimate.

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