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Differential Equations and Applied Math Seminar

Dr. Animesh Biswas, University of Nebraska - Lincoln

12-1pm April 8th, 2022

Zoom

Title: Nonlocal mean curvature with integrable kernel

Abstract: The focus of this talk will be on the recently introduced topic of nonlocal curvature, defined as

$$H_\Omega^J(x) := \int_{R^n} J(x - y)(\chi_{\Omega^c}(y) - \chi_\Omega(y)) \, dy,$$

where $x \in R^n$, $\Omega \subset R^n$, χ is the characteristic function for a set, $J \geq 0$ is a radially symmetric, integrable, nonincreasing convolution kernel. Several papers have studied the case of nonlocal curvature with nonintegrable singularity which requires the regularity of the boundary to be above C^2. Nonlocal curvature of this form appears in many different applications, such as image processing, curvature driven motion, deformations. Our results offer some generalizations and extensions to the constant mean curvature problem, where counterparts to Alexandrov's theorem in the nonlocal framework with the highly singular kernel were established independently by two separate groups: Ciraolo, Figalli, Maggi, Novaga, and respectively, Cabré, Fall, Solá-Moreles, Weth. By using the concept of nonlocal curvature for integrable kernels J, as discussed by Mazón, Rossi, Toledo, we are able to lower requirements on the smoothness of the boundary.

Interested faculty and graduate students are encouraged to attend.