

1156-35-304

**Daniela De Silva\*** ([desilva@math.columbia.edu](mailto:desilva@math.columbia.edu)). *A viscosity approach to the regularity of variational problems.*

In this talk we discuss some extensions of the classical Krylov-Safonov Harnack inequality. After reviewing the standard regularity theory, we will introduce a weaker notion of viscosity solutions. The novelty is that we consider functions that do not necessarily satisfy an infinitesimal equation but rather exhibit a two-scale behavior. Roughly, our viscosity solutions satisfy comparison in a neighborhood of a touching point whose size depends on the properties of the test functions. As an application, we recover the  $C^{1,\alpha}$  estimates of Almgren and Tamanini for quasi-minimizers of the perimeter functional. Further applications will be also discussed. This is also the core idea to obtain regularity of the free boundary for almost minimizers of one-phase type problems. (Received January 27, 2020)