C^1 REGULARITY FOR INFINITY HARMONIC FUNCTIONS IN TWO DIMENSIONS

ABSTRACT. A continuous function $u : \Omega \to \mathbb{R}$, $\Omega \subset \mathbb{R}^n$ is said to be infinity harmonic if satisfies

$$\triangle_\infty u := \sum_{i,j=1}^n u_i u_j u_{ij} = 0 \qquad \text{in } \Omega$$

in the viscosity sense.

This equation arises when considering optimal Lipschitz extensions from $\partial\Omega$ to Ω. An interesting question is to determine whether or not infinity harmonic functions are continuously differentiable.

In this talk we show that in two dimensions infinity harmonic functions are actually C^1.