Luis Silvestre*, luis@math.uchicago.edu, and Tianling Jin. Gradient Holder continuity for the parabolic homogeneous $p$-Laplacian equation.

It is well known that $p$-harmonic functions are $C^{1,\alpha}$ regular, for some $\alpha > 0$. The classical proofs of this fact use variational methods. In a recent work, Peres and Sheffield construct $p$-Harmonic functions from the value of a stochastic game. This construction also leads to a parabolic versions of the problem. However, the parabolic equation derived from the stochastic game is not the classical parabolic $p$-Laplace equation, but a homogeneous of degree one version. This equation is not in divergence form and variational methods are inapplicable. We prove that solutions to this equation are also $C^{1,\alpha}$ regular in space. (Received July 22, 2015)