6th Symposium on Analysis and PDEs

Purdue University, June 1–4, 2015

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$C^{1,\alpha}$ regularity 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. This is joint work with Tianling Jin.