

BOUNDARY REGULARITY FOR DEGENERATE AND SINGULAR PARABOLIC EQUATIONS

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ABSTRACT. A boundary point is *regular* with respect to a partial differential equation if all solutions to the Dirichlet problem attain their continuous boundary values continuously at that point.

The characterisation of regular boundary points for different partial differential equations has a very long history, and the boundary regularity for the nonlinear diffusion equation is a very challenging problem.

In the mini-course, I will show how to characterise regular boundary points for the parabolic p -Laplacian, $1 < p < \infty$,

$$\frac{\partial u}{\partial t} = \operatorname{div}(|\nabla u|^{p-2} \nabla u)$$

in terms of a family of barrier functions.

By constructing suitable families of such barriers, both when $p > 2$ and $1 < p < 2$, I will give some simple geometric conditions that ensure the regularity of boundary points.