

A study on gradient blow-up for a Hamilton-Jacobi equation with a nonlinear diffusion

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This talk is concerned with the gradient blow-up phenomenon for the following quasilinear parabolic equation:

$$u_t = \Delta_p u + |\nabla u|^q \quad \text{in } (0, T) \times \Omega.$$

We present some recent results for the degenerate case $p > 2$ including gradient blow-up rate, spatial profile and continuation beyond the singularities. We will mostly focus on the location of gradient blow-up points within the boundary $\partial\Omega$ and more precisely on single point gradient blow-up.

This talk is based on a joint work with Philippe Souplet.