Positivity, extinction, and self-similarity for a singular diffusion equation with gradient absorption

Philippe Laurençot

Institut de Mathématiques de Toulouse, France

Qualitative properties of non-negative solutions to the Cauchy problem

$$\partial_t u - \Delta_p u + |\nabla u|^q = 0 \quad \text{in} \quad (0,\infty) \times \mathbb{R}^N$$

are studied when $N \ge 1$, $2N/(N+1) < p < 2$, and $q > 0$. Based on gradient estimates, a threshold value $q = p/2$ is identified which separates extinction in finite time and positivity for all times. Self-similar solutions and self-similar behaviour are also investigated. Joint works with Razvan Iagar.