

Some remarks on nonlinear parabolic equations with general measure data

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Abstract

Let $\Omega \subseteq \mathbb{R}^N$ a bounded open set, $N \geq 2$, and let $p > 1$; we will first investigate existence of a renormalized solution for parabolic problems whose model is

$$\begin{cases} u_t - \Delta_p u = \mu & \text{in } (0, T) \times \Omega, \\ u(0, x) = u_0 & \text{in } \Omega, \\ u(t, x) = 0 & \text{on } (0, T) \times \partial\Omega, \end{cases}$$

where $T > 0$ is any positive constant, $\mu \in M(Q)$ is any measure with bounded variation over $Q = (0, T) \times \Omega$, $u_0 \in L^1(\Omega)$, and $-\Delta_p u = -\operatorname{div}(|\nabla u|^{p-2} \nabla u)$ is the usual p -laplacian. We will try to emphasize the *new* difficulties (with respect to the elliptic case) arising from the use of parabolic capacity by showing some recent results obtained in collaboration with A. Ponce (Univ. de Tours) and A. Porretta (Univ. di Tor Vergata, Roma).