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Sharp regularity for the inhomogeneous porous medium equation

José Miguel Urbano *

We show that locally bounded solutions of the inhomogeneous porous medium equation

$$u_t - \operatorname{div}\left(mu^{m-1}\nabla u\right) = f \in L^{q,r}, \quad m > 1,$$

are locally Hölder continuous, with exponent

$$\gamma = \min\left\{\frac{\alpha_0^-}{m}, \frac{[(2q-n)r-2q]}{q[(mr-(m-1)]}\right\},$$

where α_0 denotes the optimal Hölder exponent for solutions of the homogeneous case. The proof relies on an approximation lemma and geometric iteration in the appropriate intrinsic scaling.

Joint work with Damião J. Araújo (UFPB, Brazil) and Anderson F. Maia (CMUC, Portugal).

*CMUC, Department of Mathematics, University of Coimbra, Portugal, email: jmurb@mat.uc.pt