NONHOMOGENEOUS DOUBLE PHASE PROBLEMS

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Nonhomogeneous partial differential equations play a key role in the modelling of anisotropic diffusion processes characterized by multiple degeneracy phenomena such as material depending conductivity or electromagnetic processes in ferromagnetic media. Recently, double phase problems like:

$$-\operatorname{div}\left(|Du|^{p-2}Du + a(x)|Du|^{q-2}Du\right) = f(x), \tag{0.1}$$

attracted the interest of a huge community of researchers. Equation (0.1) is mainly connected to the analysis of composite materials, characterized by the coexistence of different media that are mixed according to the behavior of the modulating coefficient $a(\cdot)$. In this talk I will present optimal Lipschitz regularity criteria that cover in particular solutions to equation (0.1). As a byproduct of this analysis, I will recover sharp regularity results for minima of variational obstacle problems including those of double phase type.

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