DIPARTIMENTO DI MATEMATICA - UNIVERSITÀ DI PISA

NEW TRENDS IN PARTIAL DIFFERENTIAL EQUATIONS AND APPLICATIONS

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Gradient bounds and rigidity results for singular, degenerate, anisotropic partial differential equations

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We consider the Wulff-type energy functional

$$\mathcal{W}_{\Omega}(u) := \int_{\Omega} B(H(\nabla u(x))) - F(u(x)) \, dx,$$

where B is positive, monotone and convex, and H is positive homogeneous of degree 1. The critical points of this functional satisfy a possibly singular or degenerate, quasilinear equation in an anisotropic medium, which is

 $\operatorname{div} \left(B'(H(\nabla u)) \nabla H(\nabla u) \right) + F(u) = 0.$

We show that entire solutions of this equation satisfy a pointwise gradient estimate in the spirit of the by now classical one by Modica. Then, we use it to prove some rigidity and symmetry properties.

This is a joint work with Prof. A. Farina (Université de Picardie 'Jules Verne', Amiens) and Prof. E. Valdinoci (WIAS, Berlin).

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