Higher gradient integrability for σ-harmonic maps in two dimensions

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Résumé

I will present some results concerning the higher gradient integrability of σ-harmonic functions u with discontinuous coefficients σ, i.e., weak solutions of div($\sigma\nabla$u) = 0. When σ is assumed to be symmetric, then the optimal integrability exponent of the gradient field is known thanks to the work of Astala and Leonetti & Nesi. I will discuss the case when only the ellipticity is fixed and σ is otherwise unconstrained and show that the optimal exponent is attained on the class of two-phase conductivities $\sigma : \Omega \subset$ Rˆ2 $\to \{\sigma$_1,σ_2$\} \subset$ Mˆ2×2. For such a class we also characterise the minimal exponent q $\in$ (1, 2) and the maximal exponent p > 2 such that if ∇u $\in$ Lˆq then ∇u $\in$ Lˆp_weak. (Joint work with Nesi & Ponsiglione and S. Fanzon.)

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