



Seminar/Talk

Nonlinear potentials at the fractional scale: sharp regularity

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Schauder estimates are a basic tool in elliptic and parabolic PDE and ultimately establish that solutions are as regular as coefficients. They intervene in many situations, such as higher regularity of solutions to problems showing any kind of ellipticity, including free boundaries, bootstrap processes, existence theorems and so on. In the linear case they are a classical topic, with results obtained since the '20s of the past century by Hopf, Giraud, Caccioppoli and Schauder. New proofs were achieved over the years by Campanato (via proper function spaces), Trudinger (via convolution methods), Leon Simon (via blow-up). Nonlinear versions were settled by Giaquinta & Giusti, Ivert, DiBenedetto, Manfredi. All these results deal with uniformly elliptic operators, and unavoidably rely on perturbation methods, i.e., freezing coefficients and comparing original solutions to solutions with problems without coefficients. Such methods do not any longer deliver results in nonuniformly elliptic problems, for which homogeneous a priori estimates are lost and standard iteration arguments break down. We shall present a solution to the longstanding problem of establishing the validity of Schauder estimates in the nonlinear, nonuniformly elliptic setting. This features a novel approach to a priori gradient bounds that does not rely on perturbation although the problems involved are non-differentiable. From recent, joint work with Giuseppe Mingione (Parma).

Tuesday, February 25, 2025 04:00pm - 05:00pm

Office Bldg West / Ground floor / Heinzl Seminar Room (I21.EG.101)



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