

Multiplicity of solutions for fully nonlinear equations with quadratic growth

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The study of nonlinear elliptic equations with quadratic dependence in the gradient had its beginning in the '80s, essentially with the works of Boccardo, Murat and Puel, and has been an active research object ever since. Until 2010 almost all results concerned existence of solutions in situations where uniqueness can also be obtained. Then multiplicity of bounded solutions related to nonlinear equations with quadratic growth in the gradient was observed by Sirakov, in a very particular case related to the Laplacian, for equations with constant coefficients. Further improvements were done in the last years, specially by Arcoya, de Coster, Jeanjean, Sirakov, Souplet and Tanaka, in order to give a more clear picture of the set of solutions, still for the case of the Laplacian and by using tools applicable exclusively to divergence-form second order operators.

In this talk, we will discuss some recent results obtained for non-divergence form equations, and even for fully nonlinear uniformly elliptic scenario, in the context of L^p -viscosity solutions. We also give a generalization of the Hölder regularity results of Świech-Winter to our type of equations.

Joint work with Boyan Sirakov (PUC-Rio).

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