SHARP $C^{1+\zeta,\frac{1+\zeta}{2}}$ REGULARITY ESTIMATES FOR FULLY NONLINEAR PARABOLIC EQUATIONS

João Vitor da Silva[†]

[†] *Departamento de Matemática/FCEyN - Universidad de Buenos Aires, Argentina, e-mail:jdasilva@dm.uba.ar*

Abstract: In this talk we will study regularity estimates for viscosity solutions of non-divergence form parabolic equations as following

$$\partial_t u - F(x,t,Du,D^2u) = f(x,t) \quad \text{in} \quad \mathcal{Q}_1 := B_1 \times (-1,0],$$

where F is a second order fully nonlinear operator with merely mensurable coefficients and $f \in L^{p,q}(\mathcal{Q}_1)$, i.e., an anisotropic Lebesgue space with exponents $p,q \in (1,\infty)$ such that $0 < \frac{n}{p} + \frac{2}{q} < 1$. Under such assumptions, we will establish local $C^{1+\zeta,\frac{1+\zeta}{2}}$ regularity estimates for such models, where the sharp value of $\zeta \in (0,1)$ is explicitly found in terms of structural and universal parameters of the problem, i.e., ellipticity constants of operator, dimension and integrability of the source term.

The strategy for proving such an optimal $C^{1+\zeta,\frac{1+\zeta}{2}}$ regularity is based on a refined compactness method, as well as an iterative approximation procedure arising from [1].

This is joint work with Eduardo Teixeira from University Central of Florida - USA and based on the article [2].

REFERENCES

[1] M.G. CRANDALL; M. KOKAN AND A. SWIECH, *L^p-theory for fully nonlinear uniformly parabolic equations*, Comm. Partial Differential Equations 25, no. 11 (2000), 1997-2053.

[2] J.V. DA SILVA E.V. TEIXEIRA, *Sharp regularity estimates for second order fully nonlinear parabolic equations*, Math. Ann. 366 (2016), 1-26. doi:10.1007/s00208-016-1506-y.D.G..