Analysis/PDE Mini-course

Recent trends in regularity theory of PDEs: a geometric approach

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Abstract.

In this series of Lectures we will address some recent progresses in regularity theory of elliptic/parabolic PDEs, which were developed in the recent decades (e.g. a Schauder theory for Laplacian operator, $C^{1,\alpha}$ estimates for degenerate elliptic operators and $C^{\alpha,\frac{\alpha}{2}}$ estimates for Heat operator with anisotropic source).

The insights behind the expositions consist of explaining their mathematical relevance, intrinsic difficulties in being overcome and applications in other classes of problems. In the end of the Lectures we will present new directions and some mathematical expectations for the next years in such subjects of research.

These Lectures are accessible for all students in the Master and Doctoral level, as well as other interested people.

References

[1] Xavier Fernández-Real & Xavier Ros-Oton, *Regularity Theory for Elliptic PDE.* Book, 2020.

[2] Nicolai V. Krylov, *Lectures on elliptic and parabolic equations in Hölder spaces.* Graduate Studies in Mathematics, 12. American Mathematical Society, Providence, RI, 1996. xii+164 pp.

[3] Eduardo V. Teixeira, *Introdução à teoria de regularidade elíptica: uma abordagem geométri.* III ENAMA, Maringá, 2009.

[4] Eduardo V. Teixeira, *Um convite à análise geom'etrica de EDPs elípticas de 2a ordem.* IV EBED, João Pessoa, 2011.

[5] Lihe Wang, *Regularity Theory.* Korea Winter School, 2013.