

Theoretical and Numerical Contributions to the Control of PDEs

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Abstract In this talk, I will try to present some recent advances in the control of PDEs. Specifically, I will refer to:

- Control and domain identification for heat and Burgers PDEs and associated free-boundary systems.
- Null control of two-phase Stefan free-boundary problems.
- Nash and Pareto equilibria for Navier-Stokes PDEs and other similar systems.
- Minimal time control problems and applications, etc.

The results have been obtained in collaboration with A. Doubova, I. Marín-Gayte, M. González-Burgos and D.A. Souza, among others; see [1] and the references therein.

I will also present with detail several related open questions that may motivate the work in the next future. To this regard, I will try to explain the results we need, what is expected and what is not and how numerical experiments can help to understand and catch the ideas.

Keywords: Control theory, null controllability, bi-objective optimal control, parabolic PDEs and systems, Stefan free-boundary problems, Navier-Stokes equations.

References

- [1] E. FERNÁNDEZ-CARA, *Remarks on control and inverse problems for PDEs*, SeMA Journal (to appear).