



Workshop on Nonlinear Analysis and Control Theory in Honor of Professor Enrique Zuazua for his 60th birthday

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Reachable spaces for infinite dimensional systems

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Abstract

We consider a problem of major interest in control theory: characterizing the set of all the states which can be attained by an infinite dimensional system by using controls possibly satisfying regularity or size constraints. The study of this question is at the very heart of finite dimensional control theory, but only at its beginning in an infinite dimensional setting. In the case of systems governed by parabolic PDEs, one of the pioneering papers is co-authored by Enrique Zuazua [1] and it describes some robustness properties with respect to non local perturbations. Motivated by the results in [1]; we develop a perturbation theory for systems which are null controllable in any positive time, with applications to both linear and nonlinear problems. We finally discuss some recent advances and open questions concerning both parabolic and hyperbolic type equations.

References

- [1] E. Fernández-Cara, Q. Lü and E. Zuazua, Null controllability of linear heat and wave equations with nonlocal spatial terms, *SIAM J. Control Optim.*, **54** (2016), 2009–2019.