Null Controllability with Vanishing Energy for boundary control systems

The paper [PZ03] (E. Priola and J. Zabczyk, Null controllability with vanishing energy, SIAM J. Control Optim. 2003) introduces and studies the concept of null controllability with vanishing energy (NCVE) for distributed control systems in Hilbert space. More precisely, in [PZ03] we obtain a characterization of linear, null controllable systems, for which an arbitrary initial state can be transferred to the origin with arbitrarily small energy. The result allows also to determine Ornstein-Uhlenbeck processes for which the Liouville theorem about bounded harmonic functions holds.

Starting from the paper [PZ03] I will discuss recent extensions of NCVE for boundary control systems obtained in collaboration with L. Pandolfi and J. Zabczyk. Such results concern a characterization of NCVE for linear systems on a separable Hilbert space $H$, which are null controllable at some time $T > 0$ under the action of a point or boundary control (parabolic and hyperbolic control systems usually studied in applications are special cases).

While the proofs in [PZ03] depend on properties of the associated Riccati equation the study of NCVE for boundary controls systems uses the so called Linear Operator Inequality.