

Averaged controllability in a long time horizon

Abstract: We extend the recently introduced notion of averaged controllability for parameter dependent systems [1,2]. The goal is to design a control independent of the parameter that steers the averaged of the system to some prescribed value in time $T > 0$ but also keeps the averaged at this prescribed value for all times $t > T$. This new notion we address as long-time averaged controllability.

We consider finite dimensional systems and provide a necessary and sufficient condition for this property to hold. Once the condition is satisfied, one can apply a feedback control that keeps the average fixed during a given time period. We also address the L2-norm optimality of such controls. Relations between the introduced and previously existing different control notions of parameter dependent systems are discussed, accompanied by numerical examples.

This is a joint work with Jérôme Lohéac, University of Lorraine.

[1] M. Lazar and E. Zuazua: Averaged control and observation of parameter-dependent wave equations. C. R. Acad. Sci. Paris, Ser. I 352(6) (2014) 497-502.

[2] E. Zuazua: Averaged Control. Automatica 50(12) (2014) 3077–3087.