Thibault Liard

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Boundary sliding mode control of hyperbolic systems

We study the asymptotic behavior of linear hyperbolic systems subject to unknown boundary disturbances. Our aim is to construct a boundary feedback law, based on a sliding mode procedure, which rejects the disturbance in finite time and which globally stabilizes the equilibrium point zero. The main novelty of our approach consists in defining a sliding variable and a corresponding sliding surface on which the global exponential stability is ensured. More precisely, the sliding surface is derived from the gradient of a Lyapunov function. We will extend this approach to an equation of conservation laws with simulations.

Biography

Thibault Liard earned his PhD in observation and control for some conservative systems under the supervision of Alain Haraux and Yannick Privat. From 2017 to 2019, his Postdoctoral positions were focused on the study of strongly coupled PDE/ODE systems where the PDE consists of a system of conservation laws and the ODE represents the trajectory of particles. From 2019 to 2020, he was a Postdoctoral researcher at the ERC Advanced Grant project DyCon under the supervision of Prof. Enrique Zuazua where he was working on inverse problems of conservation laws. From 2020, he is Postdoctoral researcher at LS2N with Swann Marx where he is focusing on control and stabilization of conservation laws.

His main research interests are control theory, calculus of variations, inverse problem, coupled PDE/ODE, hyperbolic systems and wave-front tracking algorithm.