

Master M2-SIAM internship subject 2019/2020

Subject: Tracking control for a class of hybrid dynamical systems

This Master 2 subject concerns the analysis and the trajectory tracking control problem for linear complementarity systems (LCS), which is an important class of non-linear and non-smooth dynamical systems, used for instance in electrical circuits modeling when set-valued components (like ideal diodes) are present, as well as in mechanical systems with unilateral compliant contacts and Coulomb's friction. After a short review of the well-posedness issues for LCS (we will restrict ourselves to LCS with absolutely continuous solutions), the work will consist of studying various classes of LCS and their properties, and find feedback controllers that guarantee the tracking of pre-specified trajectories. In particular the work will focus on robustness properties when the plant parameters are unknown, and/or the state measurements are noisy. Time-delays may also be considered. The work involves both analytical and numerical studies. Numerical simulations will be made on the INRIA software platform SICONOS¹.

Location: The work will be done in the TRIPOP Team of INRIA Grenoble Rhone-Alpes².

Financial support: Financial support will be about 500 euros per months. Depending on the obtained results, this internship may be followed by a Ph.D. thesis (academy or industry).

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¹<https://nonsmooth.gricad-pages.univ-grenoble-alpes.fr/siconos/index.html>

²<https://team.inria.fr/tripop/>