

## Dynamical Lyapunov functions for the control of switched systems

Raphaël Jungers (UCL)

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Symbolic dynamics is a beautiful theory, at the frontier between Mathematics, Computer science, Combinatorics and graph theory. The basic objects of study are the so-called "shifts": these are sets of infinite words which are closed to translation.

We will see how symbolic dynamics and hybrid control are intimately related. This will enable us to derive a large family of LMI conditions for the stability of hybrid systems, which actually encompasses many of the ones previously studied in the literature. This provides new methods that appear very efficient in theory and in practice for the analysis and design of switched systems.

Joint work with A.A. Ahmadi, P. Parrilo, M. Roozbehani.

### **Bio:**

Raphaël Jungers is a FNRS researcher at the University of Louvain, Belgium. His main interests lie in the fields of computer science, graph theory, optimization and control. He received a PhD in mathematical engineering from the Université catholique de Louvain (2008), and an engineering degree in applied mathematics, both from the Ecole Centrale Paris, France (2004), and from the Université catholique de Louvain (2005). He holds a minor degree in electrical engineering from the Université catholique de Louvain (2005). He was a postdoctoral fellow at the Department of Computer Science of the Université Libre de Bruxelles, Belgium (2008-2009), and at the Laboratory for Information and Decision Systems of the Massachusetts Institute of Technology, MA, USA (2009-2010). He is a FNRS fellow and a BAEF fellow. He was the recipient of the IBM Belgium 2009 award.

### **Website:**

<http://www.inma.ucl.ac.be/~jungers/>