

Title:

## **Distributed hybrid control of multi-agent systems under high level specifications**

Abstract:

Current control applications necessitate in many cases the consideration of systems with multiple interconnected components. These components/agents may need to fulfill high level tasks at a discrete planning layer and also coupled constraints at the continuous control layer. Towards this end, the need for combined decentralized control at the continuous layer and planning at the discrete layer becomes apparent. While there are approaches that handle the problem in a top-down centralized manner, decentralized bottom up approaches have not been pursued to the same extent. We present here some of our recent results for the problem of combined, hybrid control and task planning from high level specifications for multi-agent systems in a bottom up manner. We consider a set up where agents are assigned individual tasks in the form of temporal logic formulas and derive local task planning and control strategies for each agent. The dependencies between the formulas and the dynamic couplings between the agents are taken into account when designing the local control laws. The results are supported by simulations and experiments in different robotic testbeds.

Bio:



Dimos V. Dimarogonas received the Diploma in Electrical and Computer Engineering in 2001 and the Ph.D. in Mechanical Engineering in 2007, both from the National Technical University of Athens (NTUA), Greece. From May 2007 to February 2009, he was a Postdoctoral Researcher at the Automatic Control Laboratory, School of Electrical Engineering, KTH Royal Institute of Technology, Stockholm, Sweden, and a Postdoctoral Associate at the Laboratory for Information and Decision Systems, Massachusetts Institute of Technology (MIT), Cambridge, MA, USA. He is currently a Professor in Automatic Control, School of Electrical Engineering, KTH Royal Institute of Technology. His current research interests include multi-agent systems, hybrid systems, robot navigation, networked control and event-triggered control. Dr. Dimarogonas serves on the Editorial Board of

*Automatica*, the IEEE Transactions on Automation Science and Engineering and the IET Control Theory and Applications. He received an ERC Starting Grant from the European Commission for the proposal BUCOPHSYS in 2014 and was awarded a Wallenberg Academy Fellow grant in 2015.