

Einladung zum Vortrag

von Herrn Dr. Romain Postoyan

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A Lyapunov redesign of coordination algorithms for systems subject to resource constraints

am Donnerstag, 01.06.2017, um 11:00 Uhr, in Raum (IM) HS 11

Abstract

We will see an approach for the coordination of a network of agents in a cyberphysical environment. The agents's dynamics are nonlinear, of arbitrary dimensions and possibly heterogeneous. The objective is to design resource-aware distributed control strategies to ensure a coordination task. In particular, we aim at ensuring the convergence of the differences between the agents' output variables to a prescribed compact set, hence covering rendez-vous and formation control as specific scenarios. We develop event-based sampling strategies for that purpose. We will mainly focus on event-triggered control, in which case the agents continuously measure the relative distances with their neighbours and only update their control input at some time instants. This set-up is relevant to limit changes in control signals and therefore to reduce the resources usage of the actuators. A triggering rule is defined for each edge using an auxiliary variable, whose dynamics only depends on the local variables. We then explain how to derive time-triggered and self-triggered distributed controllers. These control strategies collect measurements and update the control inputs only at some discrete time instants, which save communication and computation resources. The existence of a uniform minimum amount of times between any two edge events is guaranteed in all cases, thus ruling out Zeno phenomenon. The analysis is carried out within the framework of hybrid systems and an invariance principle is used to conclude about coordination. This is a joint work with Claudio de Persis (University of Groningen, The Netherlands).