# 4TH ANR HANDY MEETING

**5th July 2021**
**14:00am – 17:00pm**

**Zoom link** https://cnrs.zoom.us/j/95460620119
Meeting ID: 954 6062 0119
Passcode: xxx

## PROGRAM

**2:00pm**

**Elena Petri (CRAN)**, joint work with R. Postoyan, D. Astolfi, D. Nesic and M. Heemels

### Event-triggered observer design for linear systems

We present an event-triggered observer design for linear time-invariant systems, where the measured output is sent to the observer only when a triggering condition is satisfied. To this aim, we proceed by emulation and we first construct a continuous-time Luenberger observer. We then propose a dynamic rule to trigger transmissions, which only depends on the plant output and an auxiliary scalar state variable. The overall system is modelled as a hybrid system, for which a jump corresponds to an output transmission. We show that the proposed event-triggered observer guarantees a global practical asymptotic stability for the estimation error dynamics. Moreover, under mild boundedness conditions on the plant state and its input, we prove that there exists a uniform strictly positive minimum inter-event time between any two consecutive transmissions, implying that the system does not exhibit Zeno solutions. Finally, the proposed approach is applied in a numerical case study of a lithium-ion battery.

**2:40pm**

**Renato Vizuete (L2S, GIPSA-lab)**, joint work with C. Monnoyer de Galland, J. M. Hendrickx, P. Frasca, and E. Panteley

### Random coordinate descent algorithm for open multi-agent systems

We consider a distributed optimal resource allocation problem in open multi-agent systems (i.e., subject to arrivals and departures of agents). We analyze the location of the minimizer for smooth and strongly convex local cost functions, and we derive a rate of convergence in expectation for the Random Coordinate Descent (RCD) algorithm. We then extend the analysis to the open case where at each iteration either an agent is replaced, leading to the replacement of a local cost function, or a standard iteration of the RCD algorithm takes place the same way as in a closed system. We derive a linear convergence rate for connected networks, and provide conditions to guarantee convergence in expectation. Finally, a discussion around the tightness of our result is provided.

**3:20pm**

**Adel Bechihi (L2S,MERCE)**, joint work with E. Panteley and A. Bouttier

## Exponential Convergence of the Consensus Algorithm over a Shared Broadcast Channel

We present a special class of consensus algorithms for autonomous multi-agent systems of continuous-time single integrators. The communication system a shared broadcast channel represented by a switching topology where only one agent can transmit at a time. This system is designed to deal with the problem of interference and packet collision. A Lyapunov function is proposed to prove the exponential convergence of this class of consensus algorithms under mild assumptions. An explicit bound depending of the communication system parameters is provided.