Mercredi 22 mai à partir de 14h

CRAN – Vandœuvre-lès-Nancy

Amphithéâtre Cuenot, ENSEM

Informations pratiques

- Adresse : 2 avenue de la forêt de Haye, 54516 Vandœuvre-lès-Nancy - Accès : https://tinyurl.com/yxzlrlsm
- Aucune inscription n'est requise
- Contact : romain.postoyan@univ-lorraine.fr

First part: Networked control systems

14h - 14h30 Daniel Liberzon (Univ. of Illinois at Urbana Champaign, U.S.A.)

Entropy and quantized control

We will discuss a notion of estimation entropy for continuous-time nonlinear systems, formulated in terms of the number of functions that approximate all system trajectories up to an exponentially decaying error. This entropy notion characterizes minimal data rates for state estimation and control. Another problem in which it plays a role is that of determining, from quantized state measurements, which of two competing models of a dynamical system is the true model. Some ongoing work on computing entropy for switched systems will also be briefly mentioned.

14h30 - 15h Maurice Heemels (TU Eindhoven, Netherlands)

Periodic-event triggered control: LQG, L2-gains and more

15h - 15h30 Dragan Nesic (Univ. of Melbourne, Australia)

Networked Control Systems (NCS) with WirelessHART (WH) – modelling and design

We consider non-linear NCSs closed over a wireless multi-hop network called WirelessHART. We provide hybrid non-linear models that capture the key features of the WH network, i.e. time-varying transmissions, both at- and inter-transmission

behaviour, packet dropouts, hop dynamics, slotted communication cycles, and multiple transmissions over different channels. We then use these models to provide stability results in the context of controller design, observer design, and stochastic design. The talk will summarise our results and the main features of our recent work.

15h30 – 16h Coffee break

Second part: Saturated-like control and estimation

16h30 - 17h Sophie Tarbouriech (LAAS-CNRS, Toulouse)

High-gain dead-zone observers for linear and nonlinear plants

We propose an adaptive dead-zone mechanism to robustify observers against high-frequency noise. The construction applies to Luenberger observers and high-gain observers for plants in strict feedback form. The dead-zone improves performances by trimming a portion of the output injection term and trapping the high frequency noise in the dead band. We show that the observer gain and the adaptation parameters can be obtained by solving a linear matrix inequality, whose feasibility only requires detectability of the plant. The parameters obtained through this optimization ensure (in the absence of noise) global exponential stability of the estimation error dynamics, and input-to-state stability (ISS) from the measurement noise to the estimation error.

17h - 17h30 Christophe Prieur (GIPSA-lab, Grenoble)

Beam equation with saturating piezoelectric controls

This talk deals with a controlled beam equation for which the input is subject to magnitude saturation. A partial differential equation describes the dynamics of the deflection of the beam with respect to the rest position. The input is the voltage applied on an actuator located in a given interval of the space domain. Two kinds of control are considered: a static output feedback law and a dynamical output feedback control law. In both cases, the saturated control is indeed applied to the beam equation. By closing the loop with such a nonlinear control, it is thus obtained a nonlinear partial differential equation, which is the generalization of the classical beam equation. The well-posedness is proven by using nonlinear semigroups techniques. Considering a generalized sector condition to tackle the control nonlinearity, the semi-global asymptotic stabilization system is proven by Lyapunov-based arguments. (Joint work with S. Tarbouriech.)