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Static Anti-Windup Design for Discrete-Time Large-Scale Saturated Synchrotron Systems  
17 May 2018 – h: 17:00

The presentation discusses various design strategies of static anti-windup control schemes for systems describing cross-directional processes. These are processes in which the variations of a variable in a profile orthogonal to the direction of propagation of the variable are controlled. Actually, the anti-windup synthesis approach takes advantages of the particular structure of such systems for which the interaction map between sensors and actuators along the propagation direction is expressed in terms of reduced singular value decompositions. The approach is developed within the framework of a synchrotron machine, in which electrons are accelerated in a closed circular path and bent by strong electromagnetic fields. Different results are proposed with decreasing computational complexity to evaluate the potential interest of low dimension problems to solve the anti-windup design problem.

LPV modelling of a robotic parallel manipulator  
24 May 2018 – h: 14.00

This presentation is devoted to modelling and control of a robotic pick-and-place manipulator, taking advantage of the robust control framework. Based on the classical geometric, kinematic and dynamic models of the robotic system, a linearization along a pre-specified pick-and-place trajectory allows to build a non-linear parameter-dependent model, called nonlinear parameter varying (NLPV) model. Then, one transforms the non-linear parametric dependence in a linear dependence thanks to a few approximations, to obtain an affine LPV multiple model (LPV). Vertices are then determined to build a polytopic model of the system. This polytopic model is then used to build a single and constant robust state-feedback controller, which is compared with other control strategies in simulations.

Biosketch: Isabelle Queinnec is currently CNRS researcher at LAAS-CNRS, Toulouse University. She received her PhD degree and HDR degree in automatic control in 1990 and 2000, respectively, from University Paul Sabatier, Toulouse. Her current research interests include constrained control and robust control of processes with limited information, with particular interest in applications on aeronautical systems, robotic, electronic, biochemical and environmental processes. She has been serving as member of the IFAC technical committees on "Biosystems and Bioprocesses" and on "Modelling and Control of Environmental Systems", respectively from 2002 and 2005 and of the IEEE CSS-CEB from 2013. She is currently AE for IET Control Theory and Applications and for the IFAC Journal NAHS (Nonlinear Analysis: Hybrid systems). She is co-author of a book on saturated systems and of more than 50 journal papers, both in control theory and in process engineering.

Seminar Room - Polo scientifico-tecnologico Fabio Ferrari – via Sommarive 9 - Trento

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