



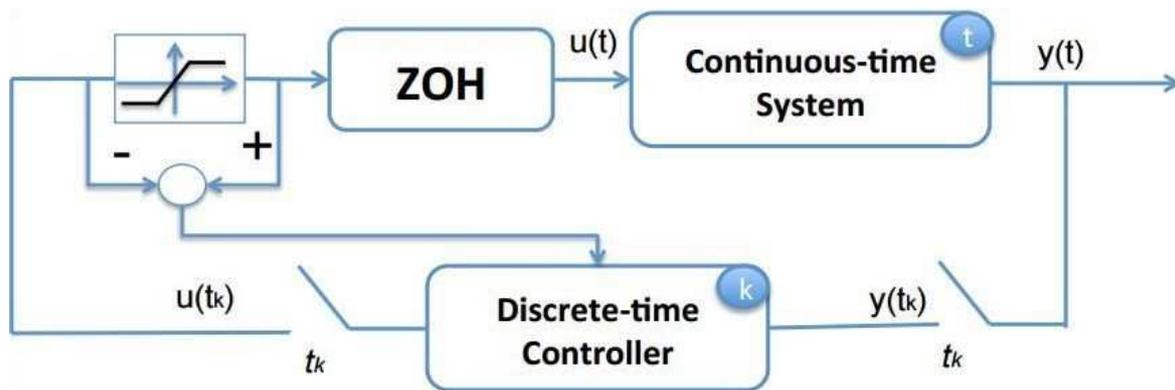
Stability Analysis of Dynamic Output Controllers under Aperiodic Sampling and Input Saturation

Isabelle Queinnec

CNRS researcher at LAAS-CNRS, University of Toulouse, France

September 8th, 2016 10:30 - 11:30

Department of Industrial Engineering
DII Seminars Room, via Sommarive 9, Povo - Trento



Abstract

This presentation addresses stability issues of sampled data controllers. Considering a continuous-time linear plant and a linear discrete-time dynamic output feedback control law designed from a classical periodic sampling paradigm, the main goal is to assess the effects of aperiodic sampling on the closed-loop stability. This aperiodic sampling models for instance the communication delays and package losses through a network and induces an hybrid behavior for the system. In addition, the effects of control signal saturation on the stability and the maximal admissible sampling interval are also taken into account. In this context, based on the use of a looped functional, linear matrix inequalities (LMI) are derived to ensure the global asymptotic stability of the origin for the aperiodic sampled-data closed-loop system, provided a bound on the maximal sampling interval is given. An optimization problem in order to evaluate the maximal admissible value for the interval between two sampling instants is then associated to the LMI conditions.

Bio

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.