TIME DELAY SYSTEMS

Webinar TDS

2024

Stability Guarantees under Sampling for Retarded Nonlinear Systems

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Dec. 6, 2024, Friday @ 4:00 pm (CET)

7:00 am (PDT), 10:00 am (EDT), 11:00 pm (CST)

Event will take place via Zoom

ABSTRACT: It is standard worldwide, in both industrial and academic activities, to design in continuous time a stabilizing state or dynamic output feedback controller for a nonlinear system and then implement it by digital devices using sampling and zero-order holding, as per the classic sampled-data emulation methodology. In the case of retarded systems, besides approximations introduced by the emulation process, further approximation is needed in the implementation by means of digital devices, because of possible non-availability in the finite memory buffer of the values of the system variables at some needed past times. The seminar is aimed to show which kind of stability guarantees can be obtained, with emulation by non-uniform sampling, for different classes of retarded nonlinear systems, in both the local and the global case. The provided results concern the closed-loop system state evolution in the whole continuous-time real axis, that is intersampling behavior problems are addressed. Time invariant systems are mostly considered, with some insights for the case with time-varying delays and discontinuous feedback.

BIO: Pierdomenico Pepe is currently serving as full professor of automatic control at the University of L'Aquila, Italy. His main research interests include stability theory, nonlinear control, observers, optimal control, with special emphasis to systems with time delays, and applications to biomedical, chemical, and electrical engineering. He has served as IPC member in several (IEEE, IFAC, SIAM) international conferences and as NOC Chair of the 6th IFAC Workshop on Time-Delay Systems, held in L'Aquila in 2006. He has been co-editor of three multi-author volumes, and of a special issue, devoted to time-delay systems, in the Springer series LNCIS and ADD, and in the International Journal of Robust and Nonlinear Control. He has served as associate editor of IEEE Transactions on Automatic Control [2011-2014], Systems & Control Letters [2012-2016], IEEE Control Systems Letters [2017-2022}, Journal of Control and Decision [2014,-), and SIAM Journal on Control and Optimization [2016,-).

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