20th World Congress of the International Federation of Automatic Control

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http://www.ifac2017.org/

Open Invited Track
on:

Stability, control and observation on non-uniform time domain

Organisers:

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Abstract: The main objective of this invited open track is to exhibit recent developments in methodologies, techniques, and applications for systems evolving on non-uniform time domain including issues such as integral inequalities on time scales, stability analysis, control and observation of nonlinear and/or switched systems on non-uniform time domains, etc. Both theoretical and application results are sought for. A second objective of the session is to provide a platform for academic and industrial communities to exchange their latest results and to identify main issues and challenges for future investigation on time scale theory for dynamical systems.

IFAC technical committee for evaluation: IFAC TC 1.3 Discrete Event and Hybrid Systems

Detailed description:

The time scale theory was firstly introduced by Stephan Hilger in his PhD thesis in 1988 in order to unify the theory of continuous dynamical systems and discrete dynamical systems. The dynamical equations are reduced to standard differential equations, in continuous time, and to classical difference equations in discrete time. In addition, between these two extreme cases, there are other interesting time domains that are a mixture between the continuous and discrete time (as a time domain formed by a union of disjoint intervals), or a discrete time domain with a non-uniform step

size.

Since 1988, this unified theory has grown substantially, resulting in a number of works dedicated to this new branch of mathematical analysis and control theory. This is motivated by the fact that in biology, in engineering or in several areas of industry, there are many dynamical systems that evolve on an arbitrary time domain that can be discrete with non-uniform sampling or a combination of discrete and continuous time domains. Indeed, the temporal nature of such systems cannot be represented by the real or the discrete time only. To overcome this difficulty, the time scale theory is very promising.

The main objective of this invited open track is to exhibit recent developments in methodologies, techniques, and applications for systems evolving on non-uniform time domain including issues such as integral inequalities on time scales, stability analysis, control and observation of nonlinear and/or switched systems on non-uniform time domains, etc. Both theoretical and application results are sought for. A second objective of the session is to provide a platform for academic and industrial communities to exchange their latest results and to identify main issues and challenges for future investigation on time scale theory for dynamical systems.

We invite worldwide researchers and experts to submit high-quality original research papers and critical survey articles on the following potential topics, but are not limited to:

- Non uniform sampling
- Stochastic time scales
- Stability analysis on time scales
- Reachability on time scales
- Lyapunov theory on time scales
- Stabilization on non-uniform time domains
- Observation on non-uninform time domains
- Applications of time scale theory

More information about IFAC-WC at:

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