Open Track Proposal on
"Recent Advances in Fuzzy Model-Based Control"

Code : nsk55

Organizers: Jun Yoneyama*, Zsófia Lendek, Tadanari Taniguchi***, and Kevin Guelton******

** Aoyama Gakuin University, Japan (e-mail: yoneyama@ee.aoyama.ac.jp)*
*** University of Cluj-Napoca, Romania (e-mail: zsofia.lendek@aut.utcluj.ro)*
**** Tokai University, Japan (e-mail: taniguchi@tokai-u.jp)*
***** CReSTIC - University of Reims Champagne-Ardenne, France (e-mail: kevin.guelton@univ-reims.fr)*

Abstract: The aim of this open invited track is to present state-of-the-art results in the area of theory and applications of fuzzy-model-based control design and analysis at large, and to get together well-known and potential researchers in this area, from both the academia and industries. Fuzzy-model-based control provides a systematic and efficient approach to the analysis and control of nonlinear systems. It has been employed to deal with a wide range of nonlinear control systems such as continuous-time, discrete-time, hybrid, sampled-data, time-delay, switching, adaptive control systems and so on. However, there is still room for improvement of the existing results in order to propose new techniques for control. This open invited track focuses mainly on the fuzzy-model-based control systems and analysis with emphasis both on theory and applications. Important problems and difficulties in fuzzy-model-based control systems will be presented, solutions will be provided and methodologies will be proposed to handle nonlinear systems using fuzzy-model-based control approaches. The session will cover classical Takagi-Sugeno fuzzy model, Type 2 and polynomial fuzzy models for stability, control and estimation, representing an important field of the TC 3.2, Computational Intelligence in Control.

***Keywords**:* Fuzzy and neural systems relevant to control and identification; Robust neural and fuzzy control; Adaptive neural and fuzzy control.

1. COORDINATING AND SUPPORTING COMMITTEES

The main sponsor of this open invited track is the IFAC TC3.2 « Computational Intelligence in Control »[1]. It is also supported by the IEEE CIS Task Force on « Fuzzy Control Theory and Application »[2].

2. AIM AND SCOPE OF THE PROPOSED OPEN INVITED TRACK

The aim of this open invited track is to present state-of-the-art results in the area of theory and applications of fuzzy-model-based control design and analysis at large, and to get together well-known and potential researchers in this area. Fuzzy-model-based control provides a systematic and efficient approach to the analysis and control of nonlinear systems. It has been employed to deal with a wide range of nonlinear control systems such as continuous-time, discrete-time, hybrid, sampled-data, time-delay, switching, adaptive control systems and so on. However, there is still room for improvement of the existing results in order to propose new techniques for control. This open invited track focuses mainly on the fuzzy-model-based control systems and analysis with emphasis both on theory and applications. Important problems and difficulties in fuzzy-model-based control systems will be presented, solutions will be provided and methodologies will be proposed to handle nonlinear systems using fuzzy-model-based control approaches. The session will cover classical Takagi-Sugeno fuzzy model, Type 2 and polynomial fuzzy models for stability, control and estimation, representing an important field of the TC 3.2, Computational Intelligence in Control.

3. TOPICS

The main topics of this open invited track include, but are not limited to:

- Takagi-Sugeno fuzzy control systems,
- Uncertain fuzzy systems,
- Type 2 fuzzy systems,
- Fuzzy hybrid systems,
- Fuzzy switching systems,
- Fuzzy time-delay systems,
- Fuzzy stochastic systems,
- Fuzzy polynomial systems,
- Stability analysis of fuzzy systems,
- Nonlinear control design based on fuzzy systems,
- Predictive control,
- Robust control,
- Sampled-data control,
- Observer and Filtering

[1] https://tc.ifac-control.org/3/2

[2] http://lendek.net/fcta/