

Proposal for IFAC 2017 Open Invited Track “Simple Adaptive Control”

Organizers: Itzhak Barkana¹(BARKANA Consulting, Israel), Alexander Fradkov² (IPME, RAS, Russia), Ikuro Mizumoto³(Kumamoto University, Japan)

Abstract: Since the 1970s control engineers seek for solutions avoiding the need for large dynamical order and complex computations and, therefore, better suitable for application in real world systems. Designers often call their findings 'Simple Adaptive Control'. According to Web of Science more than 150 papers in peer reviewed journals have words Simple Adaptive Control in the title currently. The proposed OIT invites prospective authors to present both their contributions to the theoretical problems related to stability and performance and the detailed presentation of their particular applications dealing with adaptive controllers of low dynamical order with small number of tuned parameters.

IFAC technical committee for evaluation: TC 1.2 'Adaptive and learning systems'

Detailed description of the topic: Theoretical contributions of the 1970s, based on Lyapunov stability theory, led to first proofs of stability and had an important role in the development of model reference adaptive control (MRAC) methodologies. However, the complexity of the resulting controller often made the applicability of these methods difficult in real large scale systems.

Previous decades have seen developments of new adaptive control techniques under such names as “simple adaptive control (SAC)” and similar. Although they use different approaches, all these techniques try to avoid the need for large dynamical order and complex computations and, therefore, are better suitable for application in real world systems.

Last few years have seen quite a few works that, though different, have something in common: each one deals with large realistic plants, such as large flexible systems, robot manipulators, planes, missiles, re-entry vehicles, processes with complex dynamics, etc. Other papers treated the fine theoretical issues related to adaptive control dealing with uncertainties, variable environments, nonlinear systems or systems with delays.

The proposed Open Invited Track invites prospective authors to present both their particular contributions to the theoretical problems related to stability and performance and the detailed presentation of their particular applications.

¹ibarkana@gmail.com

²fradkov@mail.ru

³ikuro@gpo.kumamoto-u.ac.jp