https://www.ifac2017.org/

open invited tracks

The aim of this special session is to bring together colleagues that work in the field of fractional order calculus to present the latest results in fractional order systems theory and its applications. Papers describing original research work that reflects the recent theoretical advances and experimental results as well as the challenging issues are invited. This special session welcomes the submission with the following topics, but not limited to:

-- Fractional modeling (thermal systems, electrical systems, biological systems, quantum systems);
-- System identification (linear, nonlinear, LPV, model based, data driven);
-- Systems analysis (stability, monotonicity, nonlocality, observability, controllability);
-- Controllers (fractional PID, CRONE, adaptive, optimal);
-- Optimization (gradient method, LMS, RLS);
-- Numerical simulation;
-- Physical meaning;

Title: Fractional Order Systems Theory and Applications
Proposer: Yong Wang, Dingyu Xue, Donglian Qi, Junguo Lu, Yan Li
Code: 6368j
Abstract: Fractional order calculus is the natural generalization of classical integer order calculus. By the aid of fractional order calculus tools for modelling and control of dynamic systems, we can be “more optimal” as already documented in the literature. An interesting remark is that, more and more “anomalous” phenomena have been reported, even complained, under the framework of traditional integer order calculus, but in applied fractional order calculus community, it is now more widely accepted that the “anomalous” is normal in nature. Nonetheless, so many issues still need to be taken into a deeper consideration, such as, the physical meaning, initial value problem, and infinite energy storage. We believe, beneficial uses of this versatile mathematical tool of fractional order calculus in practical applications are possible and even indispensable, and fractional order calculus may become an enabler for new science discoveries. As the only fractional order session in IFAC world congress, this track, with its revealing content and up-to-date developments, joins the utmost proof for this distinctive tendency of adoption of fractional order calculus. It is our sincere hope that this track will become a milestone of a significant trend in the future development of classical and modern control theory.

Proposal submitted to 20th IFAC World Congress. Received May 25, 2016.