

Proposal for Open Invited Track at IFAC World Congress 2017

Title: Analysis, Numerics, and Control of Nonsmooth and Set-Valued Dynamical Systems

Proposers:

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Description: From system-theoretic viewpoint, the concept of set-valued operators first appeared in defining generalized gradients for non-differentiable functions, and the study of appropriate regularization of discontinuous vector fields. These fundamental ideas have gradually progressed into currently active fields of nonsmooth optimization and set-valued dynamical systems. The purpose of this session is to demonstrate the utility of convex and nonsmooth analyses for studying certain problems related to stability, control and state estimation of set-valued systems. This may include, but is not limited to, designing algorithms for simulation of such systems, stability and perturbation analyses, or addressing control and observer design problems in continuous and discrete-time. The articles are to be specifically focused on using set-valued methods, variational techniques, and discontinuity analysis in the context of studying convergence of numerical algorithms, Lyapunov-based stability arguments, or solving regulation/estimation problems; hence contributing towards bridging the gap between nonsmooth analysis and control theory.

Keywords: Modeling of discontinuous and hybrid systems; Stability analysis; Discontinuous and set-valued control; (Nonsmooth) Lyapunov methods; Nonsmooth optimization and optimal control.

Additional Information: The topics of this proposed track lie at the intersection of TC 1.3 (Discrete Event and Hybrid Systems) and TC 2.3 (Nonlinear Control Systems).