

Invited track on:

“Modeling, Identification, Estimation and Control in micromechatronic systems”

Organizers:

Prof Helon Vicente Hultmann Ayala

Dpt of Mech Eng, Pontifical Catholic University of Rio de Janeiro, Brazil, helon@puc-rio.br

Dr Tom Oomen

Dpt of Mech Eng, Eindhoven University of Technology, The Netherlands, t.a.e.oomen@tue.nl

Dr Andrew J. Fleming

School of EECS, The University of Newcastle, Australia, andrew.fleming@newcastle.edu.au

Prof Micky Rakotondrabe

Laboratoire Génie de Production, ENIT/Toulouse INP, Tarbes France, mrakoton@enit.fr

Track abstract:

Micromechatronic systems are miniaturized systems that are used to perform tasks such as positioning, manipulation, grasping, objects characterization or interrogation at small scales. While the fundamental property they should have is the high positioning resolution, which could be down to nanometers, additional performances such as high dynamics and high repeatability could be of great importance. Micromechatronic systems are found in numerous applications: microscopy based imaging, micromanipulation and microassembly, nano-indentation, data storage, medical microrobotized tasks, micro-UAV survey, aerospace micro-propulsion systems, energy harvesting, etc.

To reach the high resolution required in micromechatronic systems, these latter undergo a very different design against classical-sized mechatronic systems. They are generally based on smart materials or active materials, use flexible structures instead of joints, and might use various principle of motion such as stick-slip and inch-worm like strategies, etc. Being so, micromechatronic systems introduce several challenges in term of modeling, identification, design, signal estimation, and control. These challenges include but not limited to: uncertainties in the model structure and parameters, strong nonlinearities, high Q-factor in the frequency response, sometimes limited appropriate sensors to make real-time feedback control or online identification, high sensitivity to the environment, coupled hysteresis and other kinds of nonlinearities, etc.

The aim of this open invited track is to propose an opportunity to bring together researchers and engineers interested, using or working in micromechatronic systems and mechatronic systems for small scales. The expected papers shall include recent results in modeling, identification, signals/parameters estimation and control in these systems permitting to reach the severe performances required for the tasks at small scales whilst in presence of the various challenges.

Technical Committee: *This invited track is within the IFAC T.C.4.2-Mechatronic Systems activities.*

Keywords: modeling, identification and control methods, motion control system, estimation and filtering, data-fusion, feedback control, feedforward control, vibration control, hysteresis modeling and control, etc.

All keywords are for micromechatronic systems and mechatronic systems working at small scales.

Invited track submission code: *2bpt8*

;

Deadline: October 31st, 2019