Open Invited Track on:

"Smart materials based mechatronic systems and structures: from innovative design to control"

Technical Committee: ***IFAC T.C.4.2-Mechatronic Systems***.

Abstract: This open invited track gathers recent works related to mechatronic systems that use actuators based on smart materials and structures as basis. The invited track specifically focuses on recent design and development of such mechatronic systems and on their control, including estimation.

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Track description: This open invited track is interested in mechatronic systems and structures that use smart materials based actuators, including but not limited to: piezoelectric, shape memory alloy, magnetic shape memory alloy, electroactive polymers, magnetoactive polymers, magnetostrictive, magnetic fluid, or electrical fluid actuators. One of the main advantages from those mechatronic systems and structures is the high resolution of positioning – sometimes down to nanometers, allowing them to be used in applications that require high precision. In counterpart, they exhibit strong nonlinearities due to the complex behaviors of the smart materials actuators. Moreover, certain systems and structures can exhibit unwanted or complex dynamics such as badly damped vibration. Also, the functioning principles of certain mechatronic systems are non-standard so that their modeling and control are very specific: stick-slip, inch-worm, dual-stage, hybrid actuation, … Finally, in some of their applications, the lack of appropriate sensors is a major problem that prevents from feedback control. As a summary, smart materials based mechatronic systems and structures raise several challenges when it comes to control aspects.

We propose in this open invited track the opportunity to bring together recent works on new developments and on control aspects related to smart materials based mechatronic systems and structures. The expected papers include: design, development, modeling, estimation, and control.

TC Keywords: Smart structures and vibration control; Mechatronic system integration; Mechatronic system modeling – design – optimization; Mechatronic system estimation – identification – control; High-performance motion control systems;Micro and nano mechatronic systems; Human mechatronics and human-machine interaction; Biomedical and biomimetic mechatronic systems; Mechatronics for robotic systems; Mechatronic system fault detection, diagnostics, hardware-in-the-loop simulation; Mechatronics for mobility systems.

Additional Keywords: modeling, identification, signal estimation, advanced methodologies of control, smart materials based actuators – systems – structures.

Open Invited Track Website: https://m.rakoton.net/OITifacWC26.php

Submission Website: https://ifac.papercept.net/

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