Open Invited Track
Fractional order differentiation in Modeling, System Identification and Observation

Organizers:

Stéphane VICTOR
IMS – UMR 5218 CNRS
Univ. Bordeaux
stephane.victor@ims-bordeaux.fr

Milan Rapaić
Fakultet tehničkih nauka
University of Novi Sad
rapaja@uns.ac.rs

Abstract: This open invited track is dedicated to the recent developments on fractional systems in the field of modeling, system identification and observation, both on theoretical and application aspects.

IFAC technical committee for evaluation: TC 1.1

Open Invited Track identification code: xb3a8

Detailed description:

Fractional (or non-integer) differentiation has played a very important role in various fields notably in signal and image processing and control theory. In these last fields, important considerations such as modeling, system identification and observability are now linked to long-range dependence phenomena. It is expected that such an open invited track will attract new researchers regarding the growing research and developments on fractional calculus in the areas of mathematics, physics, engineering and particularly in automatic control.

This invited session is devoted to research topics in the field of fractional calculus in order to present and to discuss the latest results in fractional dynamical systems and signals domain:
- Signal analysis and filtering with fractional tools (restoration, reconstruction, analysis of fractal noises)
- Fractional modeling especially of (but not limited to) thermal systems, electrical systems (motors, transformers, skin effect, etc.), dielectric materials, electrochemical systems (batteries, ultracapacitors, fuel cells, etc.), mechanical systems (vibration insulation, viscoelastic materials, etc.), biological systems (muscles, lungs, etc.)
- Fractional system identification (linear, nonlinear, multivariable methods, etc.)
- Implementation aspects (fractional controllers and filters implementation, etc.)
- Systems analysis (stability, observability, controllability, etc.)
- Observer synthesis, etc.
- Applications (mechatronics, automotive, medical/biological systems,…)

Key dates:

30 June 2025 - Paper submission deadline
15 September 2025 - Notification of acceptance
15 October 2025 - Final paper submission deadline

13th IFAC Conference on Fractional Differentiation and its Applications
December 16-18 2025, Algiers, Algeria

ICFDA *Algiers* **2025**