



Thematic Session

Session title: Dynamic Systems with Fractional and Time Scale Derivatives

Organizers:

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Description of the topic:

The session will focus on two alternative approaches to calculus: fractional calculus and time scale calculus. Fractional calculus is a generalization of (integer) differential calculus, in the sense that it deals with derivatives (and integrals) of real or complex order. Fractional derivatives are non-local operators, and this characteristic allows to incorporate different types of information and to use fractional derivatives to model systems with long range interactions in space and/or time (memory) and processes with many scales of space and/or time involved. Time scale calculus was introduced by S. Hilger and B. Aulbach in order to unify continuous and discrete time dynamical systems. With time this unification aspect has been supplemented by the extension and generalization features. This theory allows to consider more complex time domains, such as $h\mathbb{Z}$, $\mathbb{T} = q^{\mathbb{N}_0}$ or hybrid domains. As a consequence, interesting applications of the time scale calculus were proposed in economy, engineering physics and biology.

2011 Mathematic Subject Classification:

26E70, 34N05, 34A08