

## Special Session Proposal for the Polish Control Conference 2026

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### Proposed Session Title: “Machine Learning methods for nonlinear system identification”

### Abstract:

The session concerns machine learning and statistical techniques for nonlinear system identification, including block-oriented models, state-space, and Volterra representations.

### Description:

This session explores developments in nonlinear system identification, particularly emphasizing traditional and emerging approaches under limited a priori knowledge.

Contributions will cover semi-parametric and non-parametric identification techniques that provide flexible, data-driven modeling without strict structural assumptions, alongside statistical methods that offer frameworks for model aggregation.

A focus is also placed on the integration of machine learning methodologies with classical system identification paradigms. These hybrid approaches are enabling new levels of accuracy and adaptability in dynamic system modeling.

The session will highlight recent progress in the identification of block-oriented systems, including Wiener, Hammerstein, and parallel structures, which are relevant in nonlinear and complex system modeling.