

# IFAC World Congress 2017 special track proposal on Nonlinear System Identification Benchmarks

**Maarten Schoukens**

Vrije Universiteit Brussel, Brussels, Belgium  
maarten.schoukens@vub.ac.be

**Jean-Philippe Noël**

University of Liège, Liège, Belgium  
jp.noel@ulg.ac.be

**Abstract:** This open invited track is structured around three benchmark systems featuring state-of-the-art challenges in nonlinear system identification, namely dynamic nonlinearity, process noise, and short data record. They are a Bouc-Wen hysteretic system, a Wiener-Hammerstein system with process noise, and a cascaded tanks setup, respectively. Solicited contributions should describe solutions to one or several of these benchmark problems. In particular, comparative overviews of methods would be particularly appreciated.

**IFAC Technical Committee for evaluation:** TC1.1 (Modelling, Identification and Signal Processing)

**Detailed Description:** This open invited track is structured around three benchmark systems featuring state-of-the-art challenges in nonlinear system identification, namely dynamic nonlinearity, process noise, and short data record. They are a Bouc-Wen hysteretic system, a Wiener-Hammerstein system with process noise, and a cascaded tanks setup, respectively. The invited track website functions as a platform providing detailed information regarding the three benchmark problems, and making available numerical and experimental data sets together with identification and validation guidelines. The invited track follows the success of the Workshop on Nonlinear System Identification Benchmarks organised in Brussels, April 25-27, 2016, on the same subject.

Solicited contributions should describe solutions to one or several of these benchmark problems. In particular, comparative overviews of methods would be particularly appreciated.

The objective of this invited track is to advance the current knowledge in nonlinear system identification by encouraging the exchange of ideas and the establishment of formal collaborations between the systems and control, mechanical and machine learning communities. These three communities have developed over the years various and numerous nonlinear modeling approaches driven by the different backgrounds, constraints and end-uses. Moreover, they generally focus on different aspects of the modeling problem as they face different limiting factors in terms of model quality and identification cost. This is why we believe that, by promoting interaction through the benchmark setups, significant benefit can be mutually gained.

**Website:** [http://homepages.vub.ac.be/meschouke/IFAC2017\\_BenchmarkTrack.html](http://homepages.vub.ac.be/meschouke/IFAC2017_BenchmarkTrack.html)