

## NONLINEAR CONTROLLERS WITH PARAMETERS TUNED USING EXPERIMENTS, DEDICATED TO AERODYNAMIC SYSTEMS

### Goal of the project

Analysis, design and implementation of control solutions with nonlinear controllers: fuzzy control techniques mixed with other nonlinear techniques: VRFT, MFC, MFAC, ADRC and SMC in order to improve the control system (CS) performance and validate the new CSs with the proposed nonlinear controllers through experiments on laboratory equipment.

### Short description of the project

Nonlinear controllers whose parameters are tuned using experiments are developed.

### Implementation period

01.02.2019 - 31.07.2020

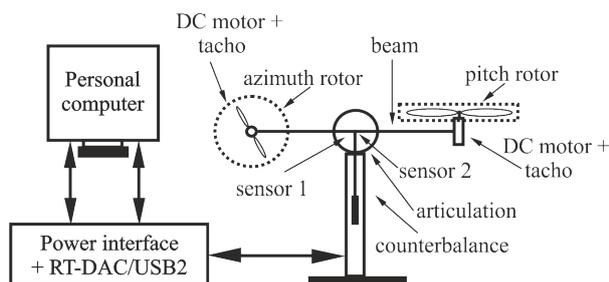
### Budget

47.600 RON (10000 EUR)

### Main activities

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1. Development of nonlinear controllers.
2. Combination of fuzzy logic with VRFT, MFC, MFAC, ADRC and SMC.
3. Deriving a mechanism to ensure the stability of CSs with nonlinear controllers in the frameworks of data-driven and fuzzy control.
3. Validation of the controllers on real-world processes in the labs of the research team.
4. Publication of results in visible conference and journal papers.



### Results

The research team published one journal paper indexed in Clarivate Analytics Web of Science (WoS, with one of the previous names ISI Web of Knowledge) (link), impact factor = 2.707 according to Journal Citation Reports (JCR) published by Clarivate Analytics in 2018 in the gray zone (Q3) of the Energy & Fuels category.

### Results - continuation

The research team published three conference papers currently indexed in the international data bases IEEExplore (link and link) and ScienceDirect (link). The proceedings of the previous editions of these conferences are indexed in WoS.

The last mentioned paper received Best Paper Award (link) at 7th International Conference on Information Technology and Quantitative Management ITQM 2019 (Granada, Spain).

### Applicability and transferability of the results:

With the support of our partner from the University of Ottawa, the new CSs with nonlinear controllers presented in Energies journal and at 2019 IEEE International Conference on Systems, Man, and Cybernetics (SMC) are in the validation process at Ontario Centers of Excellence.

### Research team

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