

ADVANCED CONTROL SYSTEM OF A BIOREFINERY PLANT (BIOCON)

Goal of the project

- Enhancement and development of data-based (data-driven) techniques and algorithms for improving control system performances using experimental data.
- Enhancement and development of nature-inspired algorithms in optimization of control system performance.
- Development of optical character recognition (OCR) applications.
- Development of new fuzzy control solutions for a wide range of industrial processes.

Short description of the project

Enhance existing techniques, develop new ones for data-based control system performance improvement.

Project implemented by

Department of Automation and Applied Informatics of UPT as the P2 partner, coordinator: "Lower Danube" University of Galati, P1 partner: University of Craiova, P3 partner: S.C. Teamnet Engineering S.R.L – Galati, director: Prof. Dr. Eng. Sergiu Caraman ("Lower Danube" University of Galati).

Implementation period

2014-2017

Main activities

- Application of Iterative Feedback Tuning (IFT) to controller tuning for nonlinear control systems.
- Model-Free Adaptive Control strategies applied to aerodynamic systems.
- An experiment-based approach to Reference Trajectory Tracking optimal control problem with constraints.
- Validation of iterative techniques on laboratory equipment: liquid level control, motion control systems with motor actuation (speed and position control).
- Enhancement of control systems performance by fuzzy control, IFT and nature-inspired optimization algorithms.
- PI and fuzzy controller tuning to ensure a reduced process parametric sensitivity.
- Improve the training algorithm of Convolutional Neural Networks using mixed Back-Propagation and nature-inspired optimization algorithms.

Results

Results in 2017:

- 2 papers published in Clarivate Analytics Web of Science (WoS) journals with impact factors.
- 2 papers published in conference proceedings indexed in WoS.
- 2 papers published in conference proceedings indexed in international databases.
- More than 30 independent citations in 2017.

Applicability and transferability of the results

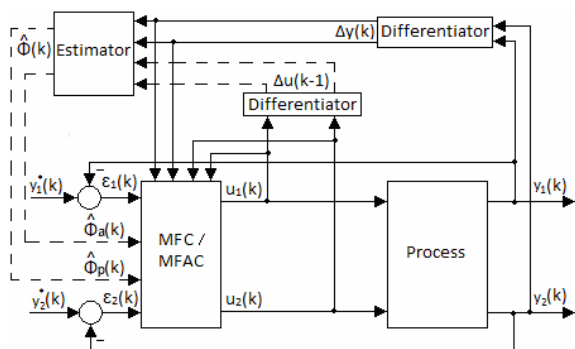
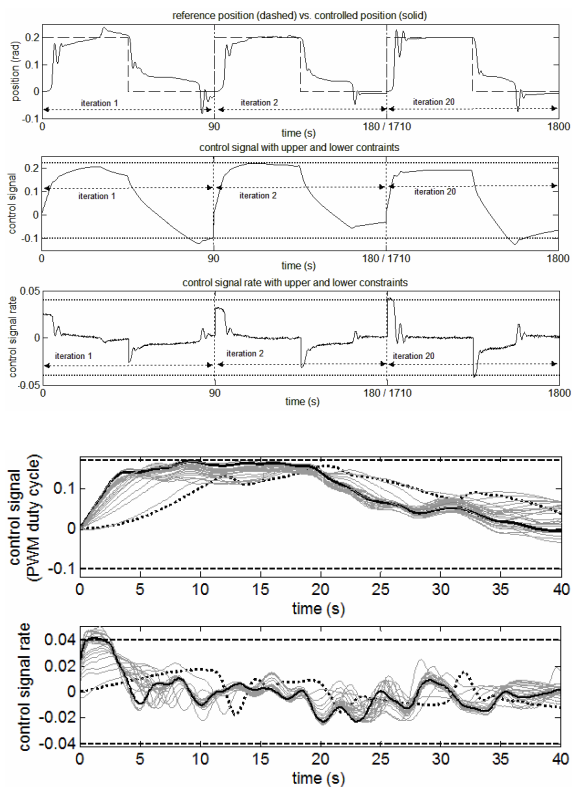
- Control systems with a reduced parametric sensitivity.
- Tools for the computer-aided design of controllers.
- Computer-aided techniques in iterative data-based control.
- Nature-inspired optimization algorithms in control design and image processing.
- Tools for the systematic development of fuzzy control systems.

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Research Centre

Automatic Systems Engineering Research Centre (CCISA).
<http://www.aut.upt.ro/centru-cercetare/index.EN.php>



Research team

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