

NATURE-INSPIRED MODELING AND OPTIMIZATION TECHNIQUES OF FUZZY CONTROL SYSTEMS WITH MECHATRONICS APPLICATIONS

Goal of the project

The aim of this project is to demonstrate efficiency and prove the viability of an innovative tuning approach for fuzzy control systems using nature-inspired algorithms in control structures modeling and optimization stages. In this framework, combining nature-inspired optimization algorithms with fuzzy control structures, will have a significant impact on the performance of fuzzy control systems.

Short description of the project

The nature-inspired optimization algorithms will be employed in solving optimization problems that minimize discrete-time objective functions expressed as integral or sum-type quadratic performance indices.

Project implemented by

Politehnica University Timișoara

Implementation period

19.10.2018 – 18.10.2020

Main activities:

The main activities are:

1. Development of efficient control solutions for different processes by bypassing the higher derivative calculations;
2. Takagi-Sugeno fuzzy controllers' optimization through minimization of several objective functions;
3. Development of performant solutions with a reduced implementation cost;
4. Experimental validation of proposed control solutions;
5. Achievements dissemination in high visibility journals and conferences;
6. Successful project management administration.

Results

The main results are related to development of nature inspired algorithm-based solutions for solving optimization problems of fuzzy systems will be disseminated at national and international levels as: four papers published in Thomson Reuters Web of Science (formerly known as ISI Web of Knowledge) publications and four presentations at international conferences.

Applicability and transferability of the results

The results obtained during this contract belong exclusively to Politehnica University Timișoara.

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Research Centre

Faculty of Automation and Computers

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