CONTROL ALGORITHMS AND OPTIMAL TUNING OF FUZZY MODELS FOR AUTOMOTIVE, MECHATRONICS APPLICATIONS AND MOBILE ROBOTS
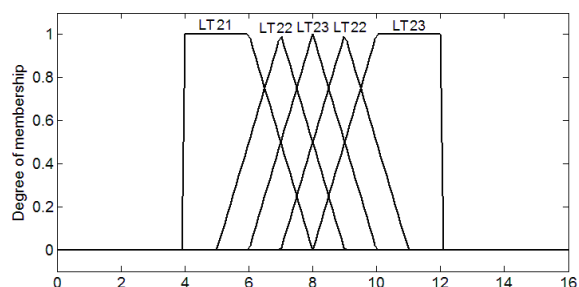
Goal of the project

Development of control structures and algorithms and optimal tuning of fuzzy models for a wide range of industrial processes, mechatronics, mobile robots and automotive applications.

Short description of the project

The project aims:
- Development of advanced control structures for automotive and mechatronics applications.
- Improvement and development of new Takagi-Sugeno fuzzy models and control solutions for a wide range of industrial processes.
- Optimal tuning of fuzzy models for automotive and mechatronics applications.
- Improvement and development of control algorithms for mobile robots.

structure control and fuzzy solutions in one- and two-degree-of-freedom formulations for electrical drives with continuously variable reference inputs, load disturbance inputs and parameters. Optimal tuning of parameters of T-S fuzzy models using nature-inspired algorithms.

New path planning and collision avoidance algorithms for mobile robots based on nature-inspired algorithms. Low-cost controller designs for vehicle power train systems with spark-ignition engine and continuously variable transmission.

Project implemented by

Department of Automation and Applied Informatics – P1 partner, coordinator: "Gheorghe Asachi" Technical University of Iasi (TUIASI), SC ROMUS Trading & Development SRL – P2 partner, director: Prof. Dr. Eng. Silvia Curteanu (TUIASI).

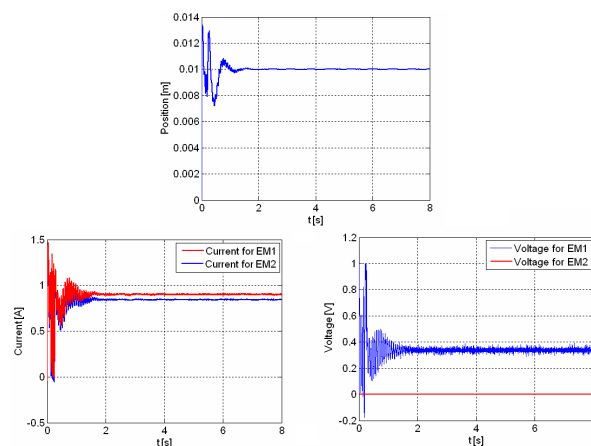### Implementation period

2012-2015

Main activities

Design of low-cost Takagi-Sugeno (T-S) state feedback fuzzy controllers for nonlinear dynamic systems.
Development and experimental validation of T-S fuzzy models of several processes in automotive and mechatronics applications.
Modelling, simulation, analysis and design of linear, variable

Results

- Please visit: http://www.romus.com/proiecte/asachi/pages/pages/phpsite_index.php.
- 6 papers published in ISI journals with impact factors.
- 2 papers published in journals indexed by international databases.
- 16 papers published in conference proceedings indexed by international databases.
- More than 50 independent citations in 2013
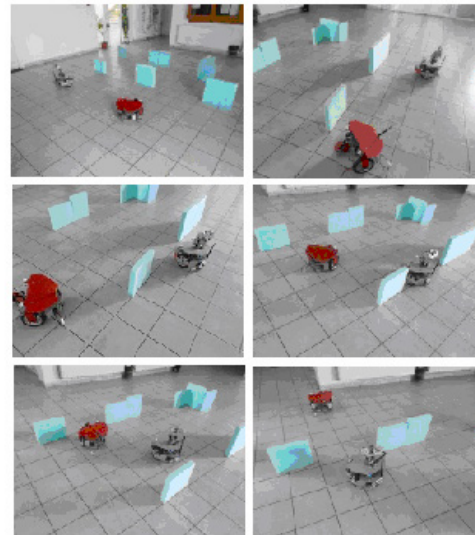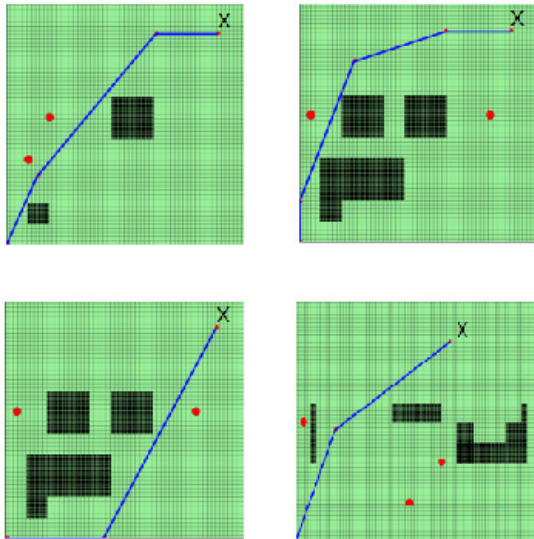
Applicability and transferability of the results

Nature-inspired optimization algorithms in modelling, control design and navigation of mobile robots, low-cost solutions for control problems in mechatronics, electrical drives, automotive and robotics, tools for the modelling, optimization and design of fuzzy control systems, real-time programming and operating systems for control and robotics.

Fields of interest

Control algorithms, optimal tuning, fuzzy models, nonlinear dynamic models, automotive, mechatronics, mobile robots, networked control systems, Programmable Logic Controllers, real-time programming, image processing.
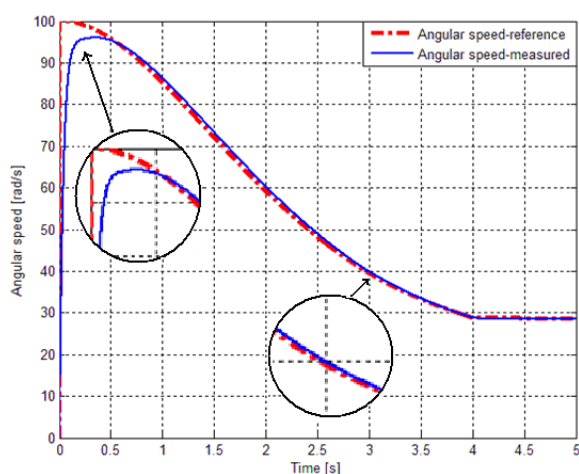
Research centre

Research Centre for Automatic Systems Engineering (CCISA)

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