


RAPID PROTOTYPING DESIGN IN CONTROL SYSTEMS

Contact details

Name	Rapid Prototyping Design in Control Systems
Acronym	RADECO
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Areas of expertise

Digital Control of electrical drives for CNC machines.
Electrical drives for industrial robots.
Equipment Setup for building automation;
Embedded systems for intelligent environment.

Team

Prof. Dr. Eng. Petru Dobra, Assist. Dr. Eng. Valentin Sita, Assist. Prof. Dr. Eng. Mirela Dobra, Dr. Eng. Liviu Tomesc, Dr. Eng. Bogdan Beta

Representative projects

VISICOM, “Vision Bases Systems for Intelligent Control and Monitoring”, CEEEX NR.X2C21/18.07.2006
“Research on sensors technology and design algorithms for signal processing”, Research Contract nr.22520/30.11.2005 UTC-N – MultiPRO Amsterdam, (2005-2006)
RADEPA, “Rapid development of prototyping for actuators systems”, CNCSIS 1257/2005
“PLC equipment for fault detection and isolation in electrical drives and sensors systems”, Research Grant CNCSIS tip E, nr. 108/2004
“H[∞] techniques for fault detection and isolation in electrical drives and sensors systems”, research grant CNCSIS AT 230/2001 & 48/2003

Significant results

The most representative publications of the past 5 years:

1. Sita Ioan-Valentin, Dobra Petru, Moga Daniel, et al., Optimization of Residential Heating Systems Using Accumulators IEEE 15th International Conference on Environment and Electrical Engineering (EEEIC), Rome, ITALY, JUN 10-13, 2015, Pp. 2165-2170, Published: 2015
2. Farcas Alin C., Dobra Petru, Adaptive control of membrane conductivity of PEM fuel cell, 7th International Conference on Interdisciplinarity in Engineering (INTER-ENG), Tirgu Mures, Romania, Oct 10-11, 2013, Vol.12, Pp.42-49, Published: 2014
3. Sita Ioan-Valentin, Dobra Petru, KNX building automations interaction with City Resources Management System 7th International Conference on Interdisciplinarity in Engineering (INTER-ENG), Tirgu Mures, Romania, Oct 10-11, 2013, Vol. 12, Pp. 212-219, Published: 2014
4. Duma Radu, Trusca Mirela, Dobra Petru, Embedded Rapid Control Prototyping: Bldc Motor Control, Proceedings Of The Romanian Academy Series A-Mathematics Physics Technical Sciences Information Science, Vol.14, Issue 2, Pp.144-151, Published 2013

6. Sita Ioan-Valentin, Dobra Petru, Universal Communication Node for Building Automation Systems, Int Conf on Smart Syst in all Fields of the Life-Aerospace, Robot, Mech Engn, Mfg Syst, Biomechatron, Neurorehabilitat and Human Motricities, Bucharest, Romania Date: OCT 24-27, 2013, Engineering Decisions and Scientific RESEARCH In Aerospace, Robotics, Biomechanics, Mechanical Engineering and Manufacturing, Book Series: Applied Mechanics and Materials, Vol. 436, Pp. 435-444, Published: 2013
7. Sita Ioan-Valentin, Dobra Petru, Dobra Mirela, et al., Household Water Tank Temperature Control Int Conf on Smart Syst in all Fields of the Life-Aerospace, Robot, Mech Engn, Mfg Syst, Biomechatron, Neurorehabilitat and Human Motricities, Bucharest, ROMANIA OCT 24-27, 2013, Engineering Decisions And Scientific Research In Aerospace, Robotics, Biomechanics, Mechanical Engineering And Manufacturing, Book Series: Applied Mechanics and Materials, Vol.436, Pp. 417-426, Published: 2013
8. R. Duma, M. Truşcă, P. Dobra, "Tuning and Implementation of PID Controllers using Rapid Control Prototyping", in *Control Engineering and Applied Informatics Journal*, vol. 13, no. 4, 2011, pp. 64-73
9. R. Duma, P. Dobra, M. Trusca, "Embedded application of fractional order control", in *Electronic Letters*, vol. 48, no. 24, 2012, pp. 1526-1528
10. R. Duma, M. Truşcă, P. Dobra, "Embedded rapid control prototyping: brushless direct current motor control application", in *Proceedings of the Romanian Academy, Series A*, vol. 14, no. 2, April - June 2013, pp. 144-151
11. R. Duma, M. Trusca, P. Dobra, "BLDC Motor Control using Rapid Control Prototyping," in *Journal of Control Engineering and Applied Informatics*, vol. 12, nr. 1, pp. 55-61, 2010.
12. P. Dobra, M. Truşcă, R. Duma, D. Petreuş, "Wireless low cost embedded solution for electrical motors control", *Proc. of 5th European DSP in Education and Research Conference*, Amsterdam, Holland, 13-14 September 2012
13. P. Dobra, M. Truşcă, I. V. Sita, R. A. Munteanu, M. Munteanu, "Model Based Approach in Fault Detection and Diagnosis for DC Motor", *8th IEEE Int. Symposium on Diagnostics for Electrical Machines, Power Electronics & Drives*, Bologna, Italy, 2011
14. R. Duma, P. Dobra, M. Trusca, D. Petreus, D. Moga, "Towards a Rapid Control Prototyping Toolbox for the Stellaris LM3S8000 Microcontrollers", *Proceedings of the IFAC 18th World Congress*, Milano, Italy, August 28-September 2, 2011, pp. 1965-1970
15. R. Duma, M. Trusca, P. Dobra "BLDC Motor Control using Rapid Control Prototyping," in *Journal of Control Engineering and Applied Informatics*, vol. 12, nr. 1, 2010, pp. 55-61

Significant solutions:

Golden Medal, Innova, Bruxelles, 2011, "Automatic system for the analysis of electrical energy quality", Radu Munteanu, Petru Dobra, Daniel Moga, Radu Adrian, Munteanu, Mihai Stelian Munteanu, Mirela Truşcă, Dorin Petreuş, Valentin Sita

The offer addressed to the economic environment

Research & development	<p>Digital control system development for electrical drives with BLDC and PMSM motors</p> <ul style="list-style-type: none"> - implementation of EPLAN and Autocad Electrical projects; - ladder and C++ programming; - implementation of SCADA graphical interfaces; - control algorithms in Matlab, Labview; <p>Upgrade, replacement or retrofitting electrical drives for</p> <ul style="list-style-type: none"> - medium CNC machines - industrial robots with DC / Stepper / BLDC/ PMSM motors - configuring PLC's (Siemens, Omron). <p>Equipment Setup for building automation;</p> <ul style="list-style-type: none"> - PLC based automation systems; - energy resources management; - using KNX and LOGO! Controllers.
Consulting	<p>Microcontrollers/PLC/ FPGA programming environments, data acquisition procedures Programming in C, C++, PHP, Java, Matlab; Home Automation Configuring (KNX and LOGO! Controllers)</p>
Training	<p>Implementing Embedded Control Systems for:</p> <ul style="list-style-type: none"> - electrical drives (DC motors, BLDC motors, PMSM motors) - inteligente sensors systems (temperature, humidity, pressure) - home automation (KNX and LOGO! Controllers)