POWER ELECTRONIC CONVERTER AND ELECTRIC MACHINE CONTROL

Contact details

Name	**Power Electronic Converter and Electric Machine Control**
Acronym	**PECEMCo**
Logo	
Site	http://research.utcluj.ro/index.php/domenii-de-cercetare.html, http://emd.utcluj.ro
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Areas of expertise

Domain: Electrical Engineering
Sub-domain: Electrical Machines and Equipment, Power Electronics and Electrical Drives
Keywords: Controlled electrical drives, Intelligent power electronic converters, Scalar and Vector control of AC machines, DC micro-grids.

Team

Prof. Dr. Eng. Maria Imecs, Assoc. Prof. Dr. Eng. Ioan Iov Incze, Assist. Prof. Dr. Eng. Csaba Szabo, Assist. Prof. Eng. Eniko Szoke, Assist. Prof. Eng. Melinda Sollange Radian Kreiszer, Assist. Prof. Dr. Eng. Dan Claudiu Rus
Phd. students: Eng. Andrei Victor Ionescu (Pop), Eng. Cornel Alin Negrea, Eng. Vlad Zacharias, Eng. Zoltan Kacso, Eng. Mircea Giurgiu

Representative projects

DCiDER, **"Emerging DC Distribution Grids for Optimal Use of Dispersed Generation"**, CEEX, (2005-2008)
DCNET, **"DC Distribution Networks for Industrial Applications"**, CNCSIS, (2006-2008)
"Digital Control of Energy-Efficient Ecological Power Electronic Converter - A.C. Motor Assemblies Connected to a Local D.C. Grid",CNCSIS, (2007-2008)
"Research and implementation of vector control systems for AC motor drives fed by ecological (line-and motor friendly) intelligent frequency converters", CNCSIS, (2004-2006)
"Energy-Saving Automated Drive Systems for Conveyors and Machine Tools", Hungarian-Romanian Intergovernmental S&T Cooperation Program, (2003-2005)
"Intelligent electrical drive system with vector controlled induction motor", CNCSIS, (2002)
"Intelligent electrical drive system with vector controlled induction motor", ANSTI, (2000)
DSP, **"Vector control of AC drives realized with digital signal processor"**, ANSTI

Significant results

The most representative publications of the past 5 years:

1. Negrea Alin Cornel, Imecs Maria, Incze Ioan Iov, et al.Error Compensation Methods in Speed Identification

using Incremental Encoder International Conference and Exposition on Electrical and Power Engineering (EPE) Iasi, ROMANIA,OCT 25-27, 2012, Pp. 441-445, Published: 2012

2. Pop Andrei Victor, Imecs Maria, Incze Ioan Iov, et al., Modeling and Simulation of Current-Controlled PWM Strategy with Regular Sampling for Constant Switching Frequency International Conference and Exposition on Electrical and Power Engineering (EPE) , Iasi, ROMANIA,OCT 25-27, 2012, Pp. 446-450, Published: 2012
3. Incze Ioan Iov, Szabo Csaba, Imecs Maria, Incremental Encoder in Electrical Drives: Modeling and Simulation 10th International Symposium of Hungarian Researchers on Computational Intelligence and Informatics, Budapest, HUNGARY Date: NOV 12-14, 2009
   Vol.313, Pp. 287-300, Published: 2010
4. Imecs Maria, Incze Ioan Iov, Szabo Csaba, Dual Field Orientation for Vector Controlled Cage Induction Motors 13th International Conference on Intelligent Engineering Systems, BARBADOS APR 16-18, 2009, Pp. 127-132 Published: 2009
5. M. Imecs, A. M. Trzynadlowski, I. I. Incze, C. Szabo, "*Vector control schemes for tandem-converter fed induction motor drives"*, in *IEEE Transactions in Power Electronics,* vol. 20, no. 2, 2005, pp. 493-501

Significant solutions:
Simulation structures in MATLAB-Simulink® of DC-line supplied by a vector controlled synchronous generator and connected to the AC grid with line-friendly static converters, loaded with controlled AC drives.

Products and technologies:
Laboratory implementation of optimal control strategies (scalar and vectorial) for induction motor.
Laboratory implementation of optimal control strategies (scalar and vectorial) for wound rotor synchronous motor.
Laboratory Implementation of optimal control strategies (scalar and vectorial) for wound rotor synchronous generator.
Laboratory implementation for optimal current controlled strategies for pulse width modulated voltage-source inverter.

Patents:
Patent ISI (ISI Web of Knowledge: *Automatic adjusting of active and reactive power using vectorial adjustment of voltage frequency and active reactive power*, Patent Number: RO104278-A, Assignee: Inst Politehnic Cluj Napoca, Inventors: Kelemen A; Imecs Maria. CNST OSIM, Nr. 104278/30.10.1989, *http://apps.isiknowledge.com/summary.do?product=UA&qid=1&SID=X1c3Fj47@JompLEObfn&sear*)

The offer addressed to the economic environment

Research & development	Development of original solutions for AC machine control Development of original algorithms for vector controlled induction motors Power electronic converters for electrical drives Simulation of controlled electrical drives and power electronic converters Optimization of electrical drives operation Pulse width modulation techniques Loss reduction in power electronic converters
Consulting	Consulting, design, research and prototype development of electrical drives solutions for multiple industrial and scientific fields. Custom integrated hardware and software solutions for specific problems related to electrical drives and power electronic converters
Training	Fundamentals of Electrical Drives Enhanced performance scalar controlled drives High performance drives using vector controlled AC machines (motors and generators) Intelligent power electronic converters Simulation of controlled electrical drives and power electronic converters