


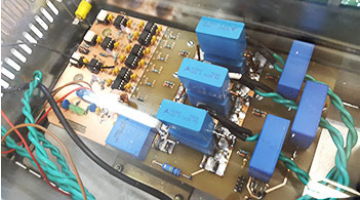


CENTER OF APPLIED RESEARCHES IN ELECTRICAL ENGINEERING FOR SUSTAINABLE DEVELOPMENT

Contact details

Name	Center of Applied Researches in Electrical Engineering for Sustainable Development	<i>GreenMot Lab with a testbench for testing electrical machines up to 4 phases, 125kW and 12,000r/min</i>	
Acronym	CCAIEDD		
Logo		Permanent magnet synchronous machine of 20kW and 26,000r/min	
Site	http://memm.utcluj.ro/ccaiedd/en/index.html		
Address	2 Observatorului str., 400489 Cluj-Napoca, Romania	150V and 200A power converter	
Faculty Department	Faculty of Electrical Engineering Electrical Machines and Drives Department		
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Director	Prof. Dr. Loránd Szabó		
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Areas of expertise

Design, modeling and optimization of electrical machines & drives for energy efficient applications in industrial, automotive and renewable energy fields
Control of electric and electromechanical systems
Condition monitoring, fault tolerance and diagnosis of electromechanical systems
DSP, microcontroller and FPGA programming
Hardware-in-the-loop (HiL) simulation in hybrid-electric vehicles

Team

Prof. Dr. Loránd Szabó, Prof. Emer. Dr. Károly Ágoston Biró, Prof. Emer. Dr. Ioan-Adrian Viorel, Prof. Emer. Dr. Vasile Iancu, Prof. Dr. Horia Hedeşiu, Prof. Dr. Claudia Marţiş, Assoc. Prof. Dr. Csaba Szász, Assoc. Prof. Dr. Daniel Fodorean, Lect. Dr. Dan-Cristian Popa, Lect. Dr. Florin Jurca, Lect. Dr. Claudiu Oprea, Lect. Dr. Ştefan Breban, Lect. Dr. Mircea Ruba. Postdoctoral researchers: Dr. Guarneri Paolo, Dr. Kula Sebastian. Phd students: Mihăiţă Alin Pantea, Ovidiu Bîrte, Tiberiu Rusu, Áron Popp, Tamás György, Mihai Alexandru Dărămuş, Arkadiusz Dziechciarz, Florin Pop Pigleşan, Andrei Paul Rozsnyai, Radu Andrei Marţiş, Alexandra Vasilache, Ioana Năsui-Zah, Anton Horatiu Tămaş.

Representative projects

ESPESA, “Strengthening the Research Potential of CAREESD in the Field of Electromechanical Systems and Power Electronics for Sustainable Applications”, H2020-TWINN-2015 - Twinning Coordination and support actions (2016-2018)
ADEPT, “Advanced electric powertrain technology”, FP7 ITN, www.adept-itn.eu (2013-2017)
DeMoTest-EV, “Design, modeling and testing tools for electrical vehicles powertrain drives” FP7 IAPP, www.demotest-ev.com (2013-2016)
EMDA_LoOp, “Optimal low-noise energy-efficient electrical machines and drives for automotive applications”, FP7 IAPP, www.emda-loop.com (2013-2016)
ARMEVA, “Advanced reluctance motors for electric vehicle applications”, FP7 Collaborative project, (2013-2016)
ELIMPUS, “Efficient Lightweight Electro-Magnetic Propulsion System for Electric Vehicles”, Young Team - TE PNII (2015-2017)
HiTECH-HEV, “Hardware-in-the-Loop Modular Platform for Testing the Energy Management of Competitive & Highly-Efficient Hybrid-Electric Vehicles”, PCCA PNII (Joint Applied Research Project), <http://www.hitech-hev.utcluj.ro> (2012-2016)
ALNEMAD, “Automotive Low-Noise Electrical Machines and Drives Optimal Design and Development”, PCCA PNII (Joint Applied Research Project), <http://memm.utcluj.ro/alnemad> (2012-2016)

Significant results

The most representative publications of the past 5 years:

1. L. Frosini, C. Harlișca, L. Szabó, "Induction machine bearing faults detection by means of statistical processing of the stray flux measurement," in *IEEE Transactions on Industrial Electronics*, vol. 62, no. 3, 2015, pp. 1846-1854
2. L. Szabó, M. Ruba, Cs. Szász, V. Chindriș, G. Husi, "Fault tolerant bio-inspired system controlled modular switched reluctance machine," in *Automatika - Journal for Control, Measurement, Electronics, Computing and Communications*, vol. 55, no. 1, 2014, pp. 53-63
3. D. Fodorean, "Study of a high speed motorization with improved performances dedicated for an electric vehicle", in *IEEE Transactions on Magnetics*, vol. 50, no. 2, 2014, pp. 921-924
4. D.C. Popa, D. Micu, O. Miron, L. Szabó, "Optimized design of a novel modular tubular transverse flux reluctance machine", in *IEEE Transactions on Magnetics*, vol. 49, no. 11, 2013, pp. 5533-5542
5. M. Ruba, I.A. Viorel, L. Szabó, "Modular stator switched reluctance motor for fault tolerant drive systems," in *IET Electric Power Applications*, vol. 7, no. 3, 2013, pp. 159-169
6. D.C. Popa, V.I. Gliga, L. Szabó, "Theoretical and experimental study of a modular tubular transverse flux reluctance machine", in *Progress in Electromagnetics Research*, vol. 139, 2013, pp. 41-55
7. V. Hrabovcová, P. Rafajdus, M. Lipták, L. Szabó, "Performance of converters suitable for switched reluctance generator (SRG) operation", in *Journal of Electrical Engineering*, vol. 64, no. 4, 2013, pp. 201-211
8. D. Fodorean, L. Idoumghar, L. Szabó, "Motorization for electric scooter by using permanent magnet machines optimized based on hybrid metaheuristic algorithm", in *IEEE Transaction on Vehicular Technology*, vol. 62, no. 1, 2013, pp. 39-49
9. Ș. Breban, C. Saudemont, S. Vieillard, B. Robyns, "Experimental design and genetic algorithm optimization of a fuzzy-logic supervisor for embedded electrical power systems," in *Mathematics and Computers in Simulation*, vol. 91, 2013, pp. 91-107
10. L. Szabó, M. Ruba, "Segmental stator switched reluctance machine for safety-critical applications", in *IEEE Transactions on Industry Applications*, vol. 48, no. 9, 2012, pp. 2223-2229
11. M. Ruba, D. Fodorean, "Analysis of fault-tolerant multiphase power converter for a nine-phase permanent magnet synchronous machine," in *IEEE Transactions on Industry Applications*, vol. 48, no. 9, 2012, pp. 2092-2101
12. D. Fodorean, L. Idoumghar, A.N 'diaye, D. Bouquain, A. Miraoui, "Simulated Annealing Algorithm for the Optimisation of an Electrical Machine", in *IET Electric Power Applications*, vol. 6, no. 9, 2012, pp. 735-742
13. A.R. Mátyás, K.Á. Biró, D. Fodorean, "Multi-Phase Synchronous Motor Solution for Steering Applications", in *Progress in Electromagnetics Research*, vol. 131, 2012, pp. 63-80
14. F. Jurca, C.S. Martiș, "Theoretical and experimental analysis of a three-phase permanent magnet claw-pole synchronous generator", in *IET Electric Power Applications*, vol. 6, no. 8, 2012, pp. 491-503

Significant solutions:

Prototypes and laboratory models of special electrical machines; static converters; fault detection and fault tolerant systems; electrical machines MiL and HiL testing and evaluation procedures, etc.

Products and technologies:

Microcontroller based boards for motor control, energy management and position detection based on resolvers, DSP development boards for motor control and diverse applications, FPGA-based development boards for motor control and divers applications, energy management: on board on light electric vehicles and hybrid power sources, HiL testing platforms for electric vehicle propulsion and auxiliaries systems.

Patents:

M. Ruba, D. Fodorean, "SRM with rotor internal self-ventilation", no. 128581/2014
M. Ruba, L. Szabó, "Fault tolerant modular electric motor," no. 12625/2013

The offer addressed to the economic environment

Research & development	<p>Electrical machines design and optimization</p> <p>Electrical drives and control based on microcontrollers, DSPs and FPGA devices</p> <p>Electromechanical systems for smart, green and integrated transportation</p> <p>Secure, clean and efficient renewable energy generation and storage systems</p> <p>Energy management on hybrid electrical power sources</p> <p>Offering advanced technical solutions for industrial clients in all of our research fields.</p> <p>Seeking for research & development partners (both from industry and academia) in all the fields of expertise of the center.</p>
Consulting	<p>Offering consultancy services for companies in all the fields of expertise of the center.</p> <p>Offering applied engineering services for companies in all of our fields of expertise.</p>
Training	<p>Offering training for under and post graduate students, Ph.D. students, engineers working in research and industry in all the fields of expertise of the Center.</p>