


# RESEARCH LABORATORY AND SUSTAINABLE DEVELOPMENT ÎN ELECTRONICS AND POWER ELECTRONICS

## Contact details

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## Areas of expertise

**DC and AC high efficiency converters;  
PWM and PFM converters control strategies ;  
High power factor and/or power conditioning converters;  
Power electronics for high efficiency lighting systems;  
High frequency, high power density converters for motor drive and renewable energy.**

## Team

**Assoc. Prof. Ph.D. Eng. Petre-Dorel Teodosescu**, Lect. Ph.D. Eng. Mircea Bojan, Lect. Ph.D. Eng. Călin Mărginean, Assist. Eng. Norbert Csaba Szekely, Assist. Eng. Vasile Mihai Suci, Assist. Eng. Sorin Ionuț Salcu, Eng. Lucian Nicolae Pintilie, Eng. Mihai Adrian Iuoraș, Eng. Alexandru Mădălin Păcuraru.

## Representative projects

**MICROINV – "High-power density and high efficiency micro-inverters for renewable energy sources"**; Action: POC-A1-A1.2.3-G-2-15 Knowledge Transfer Partnerships, (2017-2021);  
**CIA\_CLIM - "Smart buildings adaptable to the effects of climate change"** - PNIII-P1-1.2 PCCDI 2018, (2018-2020);  
**IEDPFC – "Innovative Electronic Device for Power Factor Correction"**, PN-II-PT-PCCA-2013-4-0914, (2014-2017);  
**"Influence of DC-Link capacitor aging on the PWM converters operation"**, Mobility and Environment: Researches in the fields of motor vehicle industry, energetics and environment in the Middle - and west -Transdanubian Regions of Hungary, by European Union and co-financed by the European Regional Development Fund" (2010-2013);  
**"Research on the Ecological Energy Conversion Methods with the help of PWM AC- to - DC Converters"**, CNCSIS, (2004-2006).

## Significant results

### The most representative publications of the past 5 years:

1. Teodosescu, P.D.; Szekely, N.C.; Bojan, M.: - "Flexible System for Practical, Hands-On Power Electronics Teaching", MPS 2019 - International Conference – 8th Edition International Conference on Modern Power Systems, 21-23 May 2019, Cluj-Napoca, Romania, DOI: 10.1109/MPS.2019.8759702; ISBN 978-1-7281-0750-9;
2. M. Chirca, M. Dranca, P. Teodosescu and S. Breban, "Limited-Angle Electromechanical Actuator for Micro Wind Turbines Overspeed Protection," 2019 11th International Symposium on Advanced Topics in Electrical Engineering (ATEE), Bucharest, Romania, 2019, pp. 1-6.
3. V. M. Suci, S. I. Salcu, L. N. Pintilie, P. D. Teodosescu and Z. Mathe, "Theoretical efficiency analysis of a buck-boost converter for wide voltage range operation," 2018 10th International Conference on Electronics, Computers and Artificial Intelligence (ECAI), Iasi, Romania, 2018, pp. 1-4., doi: 10.1109/ECAI.2018.8679063;

4. Szekely, N.C.; Bojan, M.; Salcu, S.I.; Teodosescu, P.D.: - "LED performance analysis under various current waveforms", ECAI 2018 - International Conference – 10th Edition Electronics, Computers and Artificial Intelligence, 28 June -30 June, 2018, Iasi, România, DOI: 10.1109/ECAI.2018.8678988; ISBN 978-1-5386-4901-5;
5. Teodosescu Petre Dorel, Szekely Norbert Csaba, Sabau Madalina Sabina and Bojan Mircea, Analysis of a Resonant AC-AC LED Driver, Optoelectronics, Advanced Device Structures, Edited by Sergei Pyskhin, Published: July 12th 2017, ISBN: 978-953-51-3370-4, DOI: 10.5772/65136;
6. Gros, Ioana-Cornelia; Popa, Dan-Cristian; Teodosescu, Petre Dorel; et al., A Survey on Green Energy Harvesting Applications Using Linear Electric Generators Conference: 7th International Conference on Modern Power Systems (MPS) Location: Cluj Napoca, ROMANIA Date: JUN 06-09, 2017;
7. Chirca, Mihai; Oprea, Claudiu; Teodosescu, Petre-Dorel; et al., Optimal Design of a Radial Flux Spoke-Type Interior Rotor Permanent Magnet Generator for Micro-Wind Turbine Applications Conference: International Conference on Applied and Theoretical Electricity (ICATE) Location: Craiova, ROMANIA Date: OCT 06-08, 2016, Book Series: International Conference on Applied and Theoretical Electricity Published: 2016;
8. Tiberiu Rusu, Petre Dorel Teodosescu, Adrian-Cornel Pop, Practical implementation of a half-bridge SRM converter for low power applications The 18th National Conference on Electrical Drives "CNAE 2016", ACTA ELECTROTECHNICA, Volume 57, Number 3-4, 2016, Special Issue, ISSN 2344-5637, pp. 473-477;
9. Petre Teodosescu, Madalina Sabau, Norbert Szekely, Mircea Bojan, Richard Marschalko, Theoretical Analysis of the Commutation Frequency Range for a PWM AC - to -DC Converter with Current Hysteresis Modulation, The 18th National Conference on Electrical Drives "CNAE 2016", ACTA ELECTROTECHNICA, Volume 57, Number 3-4, 2016, Special Issue, ISSN 2344-5637, pp. 490-496;
10. Sabau. M.S, Szekely N.C, Teodosescu PD, "Electronic device for LED lighting Systems", *The official Catalogue of the ~Cadet Inova~ Exhibition, The Scientific Bulletin Addendum*, No.1, 2016, "Nicolae Balcescu" Land Forces Academy Publishing House, pp 133-135;
11. Teodosescu, Petre-Dorel; Bojan, Mircea; Vese, Ioana-Cornelia; et al., RESEARCH CONCERNING UNIFIED ELECTRONIC LIGHTING DEVICES PROCEEDINGS OF THE ROMANIAN ACADEMY SERIES A-MATHEMATICS PHYSICS TECHNICAL SCIENCES INFORMATION SCIENCE Volume: 16 Issue: 2 Pages: 226-234 Published: APR-JUN 2015;
12. Teodosescu, P. D.; Bojan, M.; Marschalko, R., Resonant LED driver with inherent constant current and power factor correction, ELECTRONICS LETTERS Volume: 50 Issue: 15 Pages: 1087-1088 Published: JUL 17 2014
13. Teodosescu P.D., Negrea S.T., Bojan M., Marschalko R., "Local Grid Power Quality Improvements by the use of a High Power Factor LED Device", *49th International Universities Power Engineering Conference (UPEC)*, ClujNapoca, ROMANIA, Sep 02-05, 2014.

**Patents:**

1. RO131166-B1 – Electro-mechanical actuator with electronic control device, 30 Aug 2018 (Romanian);
2. EP3121952-B1 - Operating method of switched reluctance motor, 05 Dec 2018 (European);
3. RO131169-B1 - Electronic device for led lighting systems, 28 Jun 2019 (Romanian);
4. EP3300462-B1 - Capacitor direct current (DC)-link arrangement, 11 Dec 2019 (European).
5. A201900915 – Patent Application – Interleaved Buck-Boost electronic converter
6. A201900916 – Patent Application – DC Micro-grid and its control method

**Significant solutions:**

1. Introducing the new concepts of Line Conditioning Strategies - Simple Line Conditioning, Active Line Conditioning, Complex Line Conditioning and Complex Power Factor Corrections – with the help of PWM AC- to - DC Converters.
2. Development and practical implementation of several methods for Active Line Conditioning and Complex Power Factor Corrections strategies.
3. Development and practical implementation of new electronic converters for motor control, renewable energy and LED lighting applications.

**The offer addressed to the economic environment**

Research & development	RLSDEPE can cover fundamental research and development activities regarding electronics and power electronic domain, thus the mathematical analyses, software simulations, practical implementation and testing for different AC/DC power converters for small to medium power applications. The research activities can cover domains as: Energetics (power conditioning converters, uninterruptible power supplies, renewable energy converters and control strategies), Automotive (main power traction and battery charge converters, auxiliary converters for ventilation, trajectory control, electronic lighting, etc.), Lighting (High Efficiency LED drivers), converters for general motor control applications.
Consulting	The experience of the RLSDEPE members in the field of Electronics and Power Electronics could offer to the private sector technical consulting, documentation and feasibility studies. The practical implementation services are one of the strongest assets regarding RLSDEPE, thus the Laboratory can offer services regarding fundamental and theoretical research, concept studies, simulations, modelling and practical experimentations.
Training	RLSDEPE, through the experience of his members could coordinate theoretical and/or applicative training services in the field of Electronics, Power Electronics, Energetics Power Electronics Systems, CAD Electronics Circuits Modelling and Simulation, Development, Testing and Technical Services of Electronic Equipment.

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