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# Advances in Environmental Technology and Biotechnology

- **Proceedings of the 3<sup>rd</sup> International Conference on Energy and Environment Technologies and Equipment (EEETE '14)**
- **Proceedings of the 3<sup>rd</sup> International Conference on Agricultural Science, Biotechnology, Food and Animal Science (ABIFA '14)**

**Brasov, Romania, June 26-28, 2014**

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Published by WSEAS Press

[www.wseas.org](http://www.wseas.org)

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All papers of the present volume were peer reviewed by no less than two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

ISSN: 2227-4359

ISBN: 978-960-474-384-1

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**Preface**

This year the 3rd International Conference on Energy and Environment Technologies and Equipment (EEETE '14) and the 3rd International Conference on Agricultural Science, Biotechnology, Food and Animal Science (ABIFA '14) were held in Brasov, Romania, June 26-28, 2014. The conferences provided a platform to discuss new trends in energy production in classical plants, energy production impact on ecological systems, energy efficiency, energy equipment impact on climate changes, agricultural biotechnology, animal biotechnology, biomedical engineering, biomedical robotics and mechanics, computational evolutionary biology, medical informatics, metabolic modeling and pathways, protein modeling, biosensors and molecular diagnostics, breeding and genetics, cellular and molecular biology, nano biotechnology etc. with participants from all over the world, both from academia and from industry.

Their success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of these conferences are published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conferences such as these can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors



## Table of Contents

<b>Keynote Lecture: Contribution to Sustainable Development Education in an Engineering High School: Design of Small Scale “Green House” and Example of Experiments</b>	12
<i>Philippe Dondon</i>	
<b>Plenary Lecture 1: Extremum Seeking Control Applied to Different Renewable Energy Sources</b>	13
<i>Nicu Bizon</i>	
<b>Realization of Multi-Level Cluster Control Approach based on Smart Grid Inverter</b>	15
<i>Egon Ortjohann, Daniel Holtschulte, Jan Kortenbruck, Sasiphong Leksawat, Paramet Wirasanti, Danny Morton</i>	
<b>Marine Environment &amp; Aquaculture as Sustainable Tool of CO2 Capture</b>	21
<i>Angelo Ferrari, Guendalina Vito, Mauro Doimi</i>	
<b>Technical and Economical Analysis of the Wind Turbines Interconnection with the Windfarm Substation</b>	25
<i>Nicolae Coroiu</i>	
<b>F.E.M. Studies Concerning New Devices for Seismic Damping of Buildings Subjected to Romanian Vrancea Earthquakes</b>	31
<i>Adriana Ionescu, Cristian Burada, Madalina Calbureanu, Mihai Negru</i>	
<b>Evaluation of Al Qattara Depression Renewable Energy Potentials</b>	35
<i>Asad Salem, Emad Hudaib</i>	
<b>Studies on Ensuring a Longer Operation Lifetime of the Component Parts of the Heat Exchangers</b>	43
<i>Florin Ciofu, Ionela Ramona Surdu</i>	
<b>Yield and Yield Components at Maize under Different Row Spacing, Plant Population and Growing Conditions</b>	47
<i>Viorel Ion, Adrian Gheorghe Basa, Marin Dumbrava, Georgeta Dicu, Georgeta Temocico, Lenuta Iuliana Epure, Daniel State</i>	
<b>A Survey on Oncological Cases in Sentinel Animals in Campania Region</b>	57
<i>Angelo Ferrari, Marianna D’Amore, Chiara Campanella, Guendalina Vito, Guido Rosato, Vincenzo Mizzone, Stefania Cavallo, Loredana Baldi, Giorgio Galiero, Barbara Degli Uberti</i>	
<b>Setting Requirement of Agricultural Machinery in a Vegetal Farm</b>	62
<i>Nicolae Farcaș, Paul Dobre, Cristian Ovidiu Simion, Mariana Simion</i>	
<b>A Theoretical Comparison between Batwing and Lambertian Distributions of Power LEDs Related to an Interior Lighting System</b>	71
<i>Gabriel Ispas</i>	
<b>The Role of Thermal Insulation in External Walls for Energy Consumption in the Case of Famagusta, North Cyprus</b>	81
<i>Maryam Imani Emadi</i>	

<b>The Effect of Interruption Epoch Plantation for Potato Quality</b>	91
<i>Corneliu Pohontu, Ioan Gontariu</i>	
<b>Acidity of Grape Marc Extracts Obtained in the Subcritical Water Environment</b>	95
<i>V. Sukmanov, Y. Petrova, A. Golubev, I. Lagovskiy, L. Gaceu, A. Birca, O. Oprea, B. Lepadatescu</i>	
<b>Tissue Culture in Vitro as a Model System for Studying the Effects of Abiotic Stresses on Different Species of Wheat</b>	102
<i>Nina Terletskaia, Nina Khailenko</i>	
<b>The Genetic Susceptibility Analysis of the Scrapie Positive Animals from 2006 to 2013 in Southeastern Romania Outbreaks</b>	108
<i>Maria Rodica Gurău, Stelian Baraitareanu, Doina Danes</i>	
<b>Preliminary Results of Schmallenberg Virus Serosurveillance in Romania</b>	112
<i>Doina Danes, Stelian Baraitareanu, Maria Rodica Gurau, Marius Dan, Alin Bartoiu, Horatiu Moldovan, Mihai Danes</i>	
<b>Opportunities for Building Off-Shore Wind Farms in Romania</b>	117
<i>Nicolae Coroiu</i>	
<b>Simplified Formula and Daylighting Performance of External Shading Device for Small Office Room</b>	124
<i>Muhamad Fadle Mohamad Abu Sadin, Nik Lukman Nik Ibrahim, Kamaruzzaman Sopian, Elias Ilias Salleh</i>	
<b>The Effect of Crossing Romanian Sheep Breeds with Rams of Meat Breeds Over the Specific Indicators of Meat Production</b>	130
<i>Pascal Constantin, Ivancia Mihaela</i>	
<b>Researches Regarding Spruce Wood Processing with Circular Saw Blades</b>	138
<i>Cosmin Spirchez, Loredana Anne-Marie Badescu</i>	
<b>Amino Acid Sequence and Phylogenetic Analysis of VP60 Gene in Rabbit Haemorrhagic Disease Virus Zem Strain</b>	143
<i>Marius Dan, Stelian Baraitareanu, Maria Rodica Gurau, Mihai Danes</i>	
<b>Modelling and Analysis of Neural Network and Incremental Conductance MPPT Algorithm for PV Array Using Boost Converter</b>	148
<i>Naoufel Khaldi, Hassan Mahmoudi, Malika Zazi, Youssef Barradi</i>	
<b>About the Introduction of the "Ecoluminance" Concept in Design Practice of the Lighting Systems for Roundabouts in Romania</b>	154
<i>Elena Otilia Pîrlea, Gabriel Ispas</i>	
<b>Research on the Biology of the Alternaria Brassicae Fungus Isolated from Mustard</b>	161
<i>Cristinel Relu Zală, Stelica Cristea, Liviu Gruia, Mali-Sanda Manole</i>	
<b>Natural Gas Consumption and Economic Growth in Iran</b>	165
<i>Soheila Khoshnevis Yazdi, Nikos Mastorakis</i>	

<b>Study on the Life Cycle Cost of Energy Efficient Residential Buildings</b>	173
<i>Cristina Tanasa, Cristian Sabau, Dan Stoian, Daniel Dan, Valeriu Stoian</i>	
<b>The Productive Capacity of Three Hens Breeds Exposed to Heat Stress</b>	180
<i>Monica Parvu, Ioana Cristina Andronie, Violeta Elena Simion, Adriana Amfim</i>	
<b>Exotic and Native Species as Biomass for Renewable Energy</b>	183
<i>Grîu Dobrev Tatiana, Lunguleasa Aurel</i>	
<b>Computational Model of Buildings Equipped with Different Devices for Seismic Damping</b>	189
<i>Adriana Ionescu, Cristian Burada, Madalina Calbureanu, Mihai Negru</i>	
<b>Survey of Leptospira spp. in Captive Street Dogs Housed in Shelters</b>	193
<i>Stelian Baraitareanu, Maria Rodica Gurau, Doina Danes</i>	
<b>Food Additives, between Necessity and Normative Restriction</b>	198
<i>Florin Fainisi</i>	
<b>The Compulsoriness of the Energy Performance Certificate of Buildings in Some European Countries</b>	206
<i>Mihai Andronie</i>	
<b>Authors Index</b>	212

## Keynote Lecture

### Contribution to Sustainable Development Education in an Engineering High School: Design of Small Scale “Green House” and Example of Experiments



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**Abstract:** Since Rio de Janeiro conference (1992), Kyoto protocol and agenda 21 definitions, the necessity of a harmonious development is now admitted by a majority of scientific and political personalities. Even if sustainable development is a complex concept, which concerns a wide range of social, scientific, economical and environmental issues, each of us is able to do something for humanity evolution, in particular in the education field. Thus, our project started through an individual questioning of a few teachers, two years ago: What can we include in our research field and/or pedagogical thematic to have a concrete action in sustainable development, while respecting the mains scientific fields of our engineering school? The "small scale green house" project was born. In this talk, we present the main steps of the model design; According to technical standards, a scaled hand made "green" house was first built with genuine and scaled power plants, others accessories like hydrogen fuel stack, solar tracking system, solar tower were added to make the model realistic and functional for experiments. Once finished, some concrete and various didactical experiments were performed. We give here example of thermal losses investigations, carbon assessment, and solar tracking system electronic design. The transdisciplinary aspects of this work are highlighted and finally, some future evolutions are suggested.

**Brief Biography of the Speaker:** Ph. Dondon was born in 1960. He is a graduate from the High School of Electronic Engineers ENSEIRB Bordeaux, France. After his electronic engineer diploma in 1983, he worked 5 years as product manager and computer aided manufacturing (C.A.M) in the French radio-communication systems company T.R.T. Back to the IMS Microelectronic Laboratory of Bordeaux, he received his Ph D in microelectronic analogue design in 1992. He is now teaching electronic at ENSEIRB- MATMECA and has several interests in electronic circuits and electronic for sustainable development fields of research.

## Plenary Lecture 1

### Extremum Seeking Control Applied to Different Renewable Energy Sources



#### Professor Nicu Bizon

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**Abstract:** In this presentation, a Maximum Power Point Tracking (MPPT) technique is proposed for the different Renewable Energy Source (RES) based on advanced Extremum Seeking (aES) control that slightly improves the performances obtained in comparison with other MPPT control scheme. The analysis made for the aES control scheme reveals interesting relationships in frequency domain to design the control parameters, the values of closed loop gain and the dither amplitude. Thus, the imposed performances related to the search speed and tracking accuracy are easy to be obtained for the ES control based on a band pass filter (BPF) scheme.

The search speed will increase proportionally with the product of both control parameters, so it is practically limited for safe reasons, and the tracking accuracy will be proportional with the magnitude of the first power harmonic, so the power ripple will be negligible after the MPP is caught. Simulations show that the performances mentioned above are effective for the aES control based on BPF scheme, and the dither persistence is improved for the BPF scheme having a large frequencies band that cover at least six harmonics.

As it is known, the P&O method and its improved variants are most used algorithms that are implemented in MPP tracking controllers. The P&O methods are based on periodically changing of the RES operating point, observing the resulting change in the RES power. It is obvious that lower oscillations obtained during the MPPT phase decreases the RES power harvested.

Also, although MPPT control is a well established algorithm, certain instability may appear when the control parameters change rapidly, as happens in the effort to increase the overall RES efficiency applied in the Hybrid Power Sources (HPS) that have implemented a load-following control. Thus, an optimal management of all HPS subsystems to load dynamic is required.

**Brief Biography of the Speaker:** Nicu BIZON received a five-year degree in electronic engineering from the University "Polytechnic" of Bucharest, Romania, in 1986, and the PhD degree in Automatic Systems and Control from the same university, in 1996. Firstly, he was in hardware design with the Dacia Renault SA, Romania. Currently, he is Professor with the University of Pitesti, Romania, being from 2012 the dean of the Faculty of Electronics, Communication and Computers. Also, he was head of University Research Department (2004-2008) and Executive Director of the Research Centre "Modeling and simulation processes and systems" (2008-2012), being manager of two research project in field of Green and Hydrogen Energy, and team's member in other four projects in the same research field.

He is editor of six books in field of Green Energy, Hybrid Power Sources and Power Converters. His current research interests include the broad area of nonlinear systems, on both dynamics and control applied in the Green Energy field ([www.researcherid.com/rid/B-8523-2011](http://www.researcherid.com/rid/B-8523-2011)). He was authored or co-authored of several papers (over to 150) in journals (ISI web of knowledge or data base indexed) or international conferences proceedings.

He has expertise in field of renewable energy, being evaluator of Research Projects for FP7 Programme, EVAL-INCO Programme, EACI Programme, NSRF 2007-13 (Greece), NEWFELPRO 2013-17 (Croatia), CNCSIS Ideas and ANCS PN II Programme (Romania).

## Authors Index

Amfim, A.	180	Ferrari, A.	21, 57	Ortjohann, E.	15
Andronie, I. C.	180	Gaceu, L.	95	Parvu, M.	180
Andronie, M.	206	Galiero, G.	57	Pascal, C.	130
Badescu, L. A.-M.	138	Golubev, A.	95	Petrova, Y.	95
Baldi, L.	57	Gontariu, I.	91	Pîrlea, E. O.	154
Baraitareanu, S.	108, 112	Grîu, T. D.	183	Pohontu, C.	91
Baraitareanu, S.	143, 193	Gruia, L.	161	Rosato, G.	57
Barradi, Y.	148	Gurau, M. R.	108, 112	Sabau, C.	173
Bartoiu, A.	112	Gurau, M. R.	143, 193	Sadin, M. F. M. A.	124
Basa, A. G.	47	Holtschulte, D.	15	Salem, A.	35
Birca, A.	95	Hudaib, E.	35	Salleh, E. I.	124
Burada, C.	31, 189	Ibrahim, N. L. N.	124	Simion, C. O.	62
Calbureanu, M.	31, 189	Ion, V.	47	Simion, M.	62
Campanella, C.	57	Ionescu, A.	31, 189	Simion, V. E.	180
Cavallo, S.	57	Ispas, G.	71, 154	Sopian, K.	124
Ciofu, F.	43	Ivancia, M.	130	Spirchez, C.	138
Coroiu, N.	25, 117	Khailenko, N.	102	State, D.	47
Cristea, S.	161	Khaldi, N.	148	Stoian, D.	173
D'Amore, M.	57	Kortenbruck, J.	15	Stoian, V.	173
Dan, D.	173	Lagovskiy, I.	95	Sukmanov, V.	95
Dan, M.	112, 143	Leksawat, S.	15	Surdu, I. R.	43
Danes, D.	108, 112, 193	Lepadatescu, B.	95	Tanasa, C.	173
Danes, M.	112, 143	Lunguleasa, A.	183	Temocico, G.	47
Dicu, G.	47	Mahmoudi, H.	148	Terlets kaya, N.	102
Dobre, P.	62	Manole, M.-S.	161	Uberti, B. D.	57
Doimi, M.	21	Mastorakis, N.	165	Vito, G.	21, 57
Dumbrava, M.	47	Mizzoni, V.	57	Wirasanti, P.	15
Emadi, M. I.	81	Moldovan, H.	112	Yazdi, S. K.	165
Epure, L. I.	47	Morton, D.	15	Zală, C. R.	161
Fainisi, F.	198	Negru, M.	31, 189	Zazi, M.	148
Farcaș, N.	62	Oprea, O.	95		