



European Association  
for the Development of  
Renewable Energy,  
Environment and  
Power Quality

# RE&PQJ'19

## RENEWABLE ENERGIES AND POWER QUALITY JOURNAL

Volume No. 19, September 2021

ISSN: 2172-038X

INDEX



## RE&PQJ-19 EDITORIAL BOARD

**Editor-in-Chief:** Pérez Donsión, Manuel. University of Vigo  
Aguado, José Antonio. University of Málaga  
Alvárez López, Ana. University of La Coruña  
Aznar Dols, Fernando. University of Granada  
Bargalló Perpiña, Ramón. Politechnical U. of Catalonia (UPC)  
Burgos Payan, Manuel. University of Seville  
Cavallé Sesé, Francisco. Politechnical U. of Valencia (UPV)  
Coll Mayor, Debora. SMA Solar Technology AG (Germany)  
Espín Estrella, Antonio. University of Granada  
González Díaz, Benjamín J. University of La Laguna  
López Agüera, Ángeles. U. of Santiago de Compostela  
Mañana Canteli, Mario. University of Cantabria  
Martínez Melgarejo, Miguel. U. of Las Palmas de Gran Canaria  
Mazón Sain-Maza, Javier. U. of the Vasque Country  
Rouco Rodríguez, Luis. Universidad Pontificia de Comillas  
Santos Sánchez, María Jesús. University of Salamanca  
Sanz Badía, Mariano. University of Zaragoza  
Zamora Belver, Inmaculada. U. of the Vasque Country

## RE&PQJ'19 SCIENTIFIC COMMITTEE

|                                |                                |
|--------------------------------|--------------------------------|
| Ahmed, Noor E. A. (Australia)  | Janik, Przemyslaw (Poland)     |
| Albadi, Mohammed (Oman)        | Kádár Péter (Hungary)          |
| Alexandru, Catalin (Romania)   | Kiss, Péter (Hungary)          |
| Amara, Yacine (France)         | Lakhoua, M. N. (Tunisia)       |
| Andrada Gascón, P. (Spain)     | Machado e Moura, A. (Portugal) |
| Andras, Dan (Hungary)          | Mahdi, Ali Jafer (Iraq)        |
| Andrescu, G. D. (Romania)      | Malfatti, Célia (Brazil)       |
| Arcega Solsona, F. (Spain)     | Mañana Canteli, M. (Spain)     |
| Arnaltes Gómez, S. (Spain)     | Martinez, André (France)       |
| Baptista, José (Portugal)      | Melicio, Rui (Portugal)        |
| Bargalló Perpiña, R. (Spain)   | Meyer, Jan (Germany)           |
| Belik, Milan (Czech Republic)  | Narsimhulu, Sanke (India)      |
| Betini, Roberto Cesar (Brazil) | Nichita, Cristian (France)     |
| Boudghene S., A. (Argeria)     | Nocera, Francesco (Italy)      |
| Buja, Giuseppe (Italy)         | Oraee, Hashem (Iran)           |
| Burgos Payan, Manuel (Spain)   | Ozdemir, Engin (Turkey)        |
| Buzdugan, Mircea (Romania)     | Petkovska, L. (Macedonia)      |
| Camacho, José R. (Brazil)      | Pourmovahed, Ahmad (USA)       |
| Cano, José M. (Spain)          | Predescu, Mihai (Romania)      |
| Carvalho, Paulo (Brazil)       | Quinto Diez, Pedro (Mexico)    |
| Chica Arrieta, L.E. (Colombia) | Salaoro, Iulia (UK)            |
| Donsión, M.P. (Spain)          | San Martin, Jose I. (Spain)    |
| El-Sayed, Mohamed (Kuwait)     | Schlemmer, Erwin (Austria)     |
| Errami, Youssef (Morocco)      | Souto González, J.A. (Spain)   |
| Fraile Mora, Jesús (Spain)     | Stumberger, Gorazd (Slovenia)  |
| Friman, Hen (Israel)           | Tahir Çetin Akinci (Turkey)    |
| Früh, Wolf-Gerrit (UK)         | Tudorache, T. (Rumania)        |
| Gagliano, Antonio (Italy)      | Ubong, Etim (USA)              |
| Gharehpetian, G.B. (Iran)      | Valouch, V. (Czech Republic)   |
| Giurca, Ioan (Romania)         | Vergura, Silvano (Italy)       |
| Güemes Alonso, J.A. (Spain)    | Vitale, Gianpaolo (Italy)      |
| Ionnides, Maria G. (Greece)    | Vokony, István (Hungary)       |
| Iwaszkiewicz, J. (Poland)      | Zobaa Ahmed (UK)               |

The following papers have been included in the  
**Renewable Energy and Power Quality Journal (RE&PQJ'19)**

| Nº         | <i>Titles/Authors/Institution/Country</i>  |
|------------|--|
|            | <b>PP:1-6</b>  |
| <b>PI2</b> | <b>Grid access of non-synchronous generation: Review of the Spanish regulation</b><br>Luis Rouco.<br>Universidad Pontificia Comillas. Madrid, Spain  |
|            | <b>PP:7-11</b>   |
| <b>200</b> | <b>Review of Latest Developments in PEM Fuel Cell Research with Application to Hydrogen Powered Drones</b><br>B. Day, A. Pourmovahed<br>Mechanical Engineering, Kettering University Flint, Michigan. U.S.A.   |
|            | <b>PP:12-17</b>  |
| <b>201</b> | <b>Possible Link Between Climate Change and Extraordinary Wildfires in Australia, the Amazon and Western United States</b><br>M. Brajkovic, T. Carter, C. Cook, A. Pourmovahed<br>Mechanical Engineering, Kettering University Flint, Michigan. U.S.A.   |
|            | <b>PP:18-23</b>  |
| <b>202</b> | <b>What Lies Ahead for Energy and Carbon Emissions Post COVID-19</b><br>A. Pourmovahed , Z. Veneziano , M. Stewart, A. K. Thirumal<br>Mechanical Engineering, Kettering University Flint, Michigan. U.S.A.   |
|            | <b>PP:24-27</b>  |
| <b>203</b> | <b>Incentives for Renewable Energies in Colombia</b><br>F. Villada, J.D. Saldarriaga-Loaiza, J.M. López-Lezama<br>Department of Electrical Engineering Universidad de Antioquia, Medellin. Colombia  |
|            | <b>PP:28-32</b>  |
| <b>205</b> | <b>A Remote Sensing Scheme for Fault Diagnosis to Wind Turbines: An Academic Experimental Set-Up</b><br>Leonardo Acho<br>Department of Mathematics U.P.C., Polytechnic University of Catalunya. Barcelona. Spain   |
|            | <b>PP:33-38</b>  |
| <b>207</b> | <b>Energy savings approach to optimal location of EV charging stations in microgrids</b><br>Vishnu Suresh, Przemyslaw Janik, Dominika Kaczorowska<br>Faculty of Electrical Engineering Wrocław University of Science and Technology. Wrocław. Poland   |
|            | <b>PP:39-44</b>  |
| <b>208</b> | <b>Synthetic Series of Electricity Generation through a Photovoltaic System by using Different Panel Temperature Models</b><br>A. H. M. Stach ( 1,2,3), D. P. Neto (1,2,3), M. A. Vidal (2,3), O. C. N. Souto(2), S. B. Silva (2), E. G. Domingues (1,2,3)<br>1. Master's Program in Sustainable Process Technology<br>2. Electrical Engineering/Control and Automation Engineering Program NeXT–Nucleus of Experimental and Technological Studies<br>3. Federal Institute of Education, Science and Technology of Goiás. Brazil |
|            | <b>PP:45-50</b>  |
| <b>209</b> | <b>Quantification of CO<sub>2</sub> emission reductions from energy efficiency actions and solar photovoltaic the Federal Institute of Education, Science and Technology of Goiás</b><br>A. Vidal (2,3), A. F. Faria(1), A. H. M. Stach (1,2,3), D. P. Neto (1,2,3), L. S. Pinto (1,2,3), A. G. Pinho (2,3), E. G. Domingues (1,2,3)<br>1. Master's Program in Technology Sustainable Process<br>2. Electrical Engineering/Control and Automation Engineering Program  |

|            |   |
|------------|---|
|            | 3. NeXT - Nucleus of Experimental and Technological Studies Federal Institute of Education, Science and Technology of Goiás. Brazil   |
|            | <b>PP:51-56</b>   |
| <b>212</b> | <b>Positive effects of the migration from Ka-band satellite to 4G solution for the communication needs of a scattered set of 1 MW solar farms in Poland: a user's experience</b><br><b>Enrique Tébar (1), Luis Hurtado (2), Witold Bąk (3), Zbigniew Kulesza (3), Andrzej Napieralski(3)</b><br>1. University of Alicante. Spain<br>2. Vodafone Spain, Madrid. Spain<br>3. Department of Microelectronics and Computer Science, Lodz University of Technology. Poland |
|            | <b>PP:57-62</b>   |
| <b>214</b> | <b>A techno-economic analysis of floating photovoltaic systems, for southern European countries</b><br><b>J. Baptista(1,2), P. Vargas(1), J. R. Ferreira(3)</b><br>1. Department of Engineering<br>2. CPES -INESCTEC UTAD Pole University of Trás-os-Montes and Alto Douro. Portugal<br>3. Department of Electrical and Computer Engineering FEUP, Porto. Portugal  |
|            | <b>PP:63-66</b>   |
| <b>215</b> | <b>Particularities of high oxygen content biofuels pyrolysis process</b><br><b>G. Lazaroiu(1), L. Mihaescu(2), E. Pop(2), R.M. Grigoriu(1), D.A. Ciupageanu(1), I. Simion(1)</b><br>1. Power Engineering Faculty University Politehnica of Bucharest. Romania<br>2. Mechanics and Mechatronics Faculty University Politehnica of Bucharest. Romania   |
|            | <b>PP:67-72</b>   |
| <b>216</b> | <b>The Effects of High-Frequency Residual Currents on the Operation of Residual Current Devices</b><br><b>T. M. H. Slangen, B. R. F. Lustenhouwer, V. Čuk, J. F. G. Cobben</b><br>Department of Electrical Energy Systems Eindhoven University of Technology. The Netherlands   |
|            | <b>PP:73-78</b>   |
| <b>218</b> | <b>Evaluation of PV microgeneration systems and tariffs management on the energy efficiency of service buildings</b><br><b>J. Baptista(1,2), G. Sequeira(1), E. J. Solteiro Pires(1,2)</b><br>1. Department of Engineering<br>2. INESC TEC UTAD Pole University of Trás-os-Montes and Alto Douro Prados – Vila Real. Portugal   |
|            | <b>PP:79-84</b>   |
| <b>220</b> | <b>Optimal Allocation of Multiple Distributed Generations including Uncertainties in Distribution Networks by k-Means Clustering and Particle Swarm Optimization Algorithms</b><br><b>Onur Hakkı Eyüboğlu, Ömer Gül</b><br>Department of Electrical Engineering Istanbul Technical University. Turkey   |
|            | <b>PP:85-90</b>   |
| <b>222</b> | <b>Investigation on Using Low Voltage Automatic Regulation to Minimize the Impacts of Charging Plug-in Electric Vehicles in Distribution Systems</b><br><b>Priscila Costa Nascimento, Michel Giroto de Oliveira, José Carlos M. Vieira</b><br>Department of Electrical and Computer Engineering São Carlos School of Engineering (EESC) University of São Paulo (USP). Brazil   |

|            |   |
|------------|---|
|            | <b>PP:91-96</b>   |
| <b>223</b> | <b>High energy-efficient electrical drive with multilevel inverter and wide bandgap power semiconductors</b><br><b>R. Mecke</b><br>Department of Automation and Computer Sciences Harz University of Applied Sciences, Wernigerode. Germany   |
|            | <b>PP:97-102</b>  |
| <b>225</b> | <b>Survey on the Advancements of Dielectric Fluids and Experiment Studies for Distribution Power Transformers</b><br><b>S. Carvalhosa(1), H. Leite (1), F. Branco, Carlos A. Sá(1), António M. Moura(1), Ricardo C.Lopes(2), Mário Soares (3)</b><br>1. High Voltage Laboratory, Department of Electrical Engineering FEUP, Porto University. Portugal<br>2. Efacec, Transformers R&D. Portugal<br>3. Redes Energéticas Nacionais, Asset Management Department. Portugal  |
|            | <b>PP:103-108</b>   |
| <b>226</b> | <b>Study the Possibility of Implementing a Solar Chimney Power Plant in Algeria (Case study: Constantine)</b><br><b>S. Djimli(1,2), A. Chaker(3), T.E. Boukelia(2,4), A. Ghellab(1,2), A. Bouraoui(1,2)</b><br>1. Laboratory of Applied Energies and Materials, Faculty of Sciences and the Technology, University of Jijel. Algeria<br>2. Mechanical Engineering Department, Faculty of Sciences and the Technology, University of Jijel. Algeria<br>3. Energy Physics Laboratory, Department of Physics, University of Brothers Montouri Constantine. Algeria<br>4. Laboratory of Mechanical and Advanced Materials, Polytechnic School of Constantine. Algeria |
|            | <b>PP:109-114</b>   |
| <b>227</b> | <b>Experimental work over borehole filling material to reinforce characterization and model validation of Ground Heat Exchangers</b><br><b>A.J. Extremera-Jiménez(1), D. Eliche-Quesada(2), C. Guitérrez-Montes(1), F. Cruz-Peragón(1)</b><br>1. Department of Mechanical and Mining Engineering, E.P.S. de Jaén, University of Jaén. Spain<br>2. Department of Chemical, Environmental and Materials, E.P.S. de Jaén, University of Jaén. Spain  |
|            | <b>PP:115-120</b>   |
| <b>231</b> | <b>The decarbonisation of Galicia using renewable marine energy</b><br><b>L. Castro-Santos(1), A. Filgueira-Vizoso(2)</b><br>1. Universidade da Coruña, Departamento de Enxeñaría Naval e Industrial Escola Politécnica Superior, Ferrol. Spain<br>2. Universidade da Coruña, Departamento de Química, Escola Politécnica Superior, Ferrol. Spain   |
|            | <b>PP:121-125</b>   |
| <b>232</b> | <b>How important are ports for the offshore wind industry?: the case of Spain</b><br><b>A. Filgueira-Vizoso(1), F. Puime-Guillén(2), D. Cordal-Iglesias(3), A.I. García-Diez(4), I. Lamas-Galdo(5), L. Castro-Santos(6)</b><br>1. Universidade da Coruña, Departamento de Química, Escola Politécnica Superior, Ferrol. Spain<br>2. Universidade da Coruña, Departamento de Empresa, Facultade de Economía e Empresa, Ferrol. Spain<br>3. Universidade da Coruña, Escola Politécnica Superior, Ferrol. Spain  |

|            |   |
|------------|---|
|            | <p>4. Universidade da Coruña, Departamento de Enxeñaría Naval e Industrial Escola Politécnica Superior, Ferrol. Spain,</p> <p>5. Universidade da Coruña, Departamento de Ciencias da Navegación e Enxeñaría Mariña, Escola Politécnica Superior, Ferrol. Spain,</p> <p>6. Universidade da Coruña, Departamento de Enxeñaría Naval e Industrial Escola Politécnica Superior, Ferrol. Spain</p>   |
|            | <b>PP:126-130</b>   |
| <b>234</b> | <p><b>Uncertainty analysis for industries investing in energy equipment and renewable energy sources</b><br/> <b>E. M. Urbano(1), A.D. Gonzalez-Abreu(2) , K. Kampouropoulos(1), L. Romeral(1)</b><br/>           1. MCIA Research Center, Department of Electronic Engineering Universitat Politècnica de Catalunya, Terrassa. Spain<br/>           2. HSPdigital CA-Mecatronica Engineering Faculty Autonomous University of Queretaro. Mexico</p>  |
|            | <b>PP:131-136</b>   |
| <b>236</b> | <p><b>Fast testing platform for the isolation transformer</b><br/> <b>G. Bucci, F. Ciancetta, A. Fioravanti, E. Fiorucci, S. Mari, A. Prudenzi</b><br/>           Department of Industrial and Information Engineering and Economics University of L'Aquila. Italy</p>  |
|            | <b>PP:137-142</b>   |
| <b>239</b> | <p><b>Three-Phase Transformerless Inverter for Photovoltaic Grid Connected System with Zero Common Mode Noise</b><br/> <b>K. Karam, M. Badawi El Najjar, M. El Hassan</b><br/>           Department of Electrical Engineering University of Balamand Kelhat – Al Kurah. Lebanon</p>   |
|            | <b>PP:143-148</b>   |
| <b>240</b> | <p><b>Design of Power Quality Virtual Lab Toolbox using LabVIEW/Multisim</b><br/> <b>S. Haidar, E. Moussa, M. El Hassan, M. Badawi El Najjar</b><br/>           Department of Electrical Engineering University of Balamand Kelhat – Al Kurah. Lebanon</p>  |
|            | <b>PP:149-154</b>   |
| <b>241</b> | <p><b>Comparison of the Thermal Performance of Mineral Oil and Natural Ester for Safer Eco-Friendly Power Transformers</b><br/> <b>A Numerical and Experimental Approach</b><br/> <b>Sandra Couto(1), Elisabete M. Ferreira(1), Diogo Sá(1), Catarina Corte-Real(1), Pedro Lima(1), Ricardo C. Lopes(1), Artur Costa(2), Carlos A. Sá(2), Pedro Monteiro(3), Mário Soares(3)</b><br/>           1. Efacec Energia - Máquinas e Equipamentos Eléctricos, S.A. Portugal<br/>           2. Universidade do Porto, Faculdade de Engenharia, Porto. Portugal<br/>           3. REN - Rede Eléctrica Nacional, S.A., Lisboa. Portugal</p> |
|            | <b>PP:155-159</b>   |
| <b>242</b> | <p><b>A Centralized Shifted Voltage Control Method for Accurate Power Sharing in DC Islanded Microgrids</b><br/> <b>Minh-Duc Pham, Hong-Hee Lee</b><br/>           Department of Electrical Engineering University of Ulsan. Korea</p>  |
|            | <b>PP:160-165</b>   |
| <b>245</b> | <p><b>Frequency Domain Stability Assessment of Photovoltaic Power Generation Systems with Quasi-Z-Source Inverters</b><br/> <b>L. Sainz(1), LI. Monjo(2)</b><br/>           1. Department of Electrical Engineering E.T.S.E.I.B., UPC Barcelona. Spain<br/>           2. Department of Industrial Systems Engineering and Design Universitat Jaume I Castelló de la Plana. Spain</p>  |
|            | <b>PP:166-170</b>   |

|            |  |
|------------|--|
| <b>247</b> | <b>Inverter Control Analysis in a Microgrid Community Based on Droop Control Strategy</b><br><b>Navid Salehi, Herminio Martínez-García, Guillermo Velasco-Quesada, Encarna García-Vilchez</b><br>Department of Electronic Engineering Escola d'Enginyeria de Barcelona Est (EEBE), Technical University of Catalonia (UPC)-BarcelonaTech. Spain  |
|            | <b>PP:171-176</b>  |
| <b>248</b> | <b>Energy design and experimental evaluation of an industrial burner to natural gas</b><br><b>Freddy J. Rojas(1,2), Fernando Jimenez(2), Luis Napan (2)</b><br>1. Research Group on Applied Environmental Control and Energy Efficiency Methodologies (GICA)<br>2. Department of Mechanical Engineering. Pontificia Universidad Católica del Perú.   |
|            | <b>PP:177-183</b>  |
| <b>250</b> | <b>Technical and economic feasibility study of a solar plant on a commercial surface in Azogues, Ecuador</b><br><b>I. Bermeo(1), L. Matute(1), E. Barragán-Escandón(1), X. Serrano-Guerrero(1), E. Zalamea-León(2)</b><br>1. Universidad Politécnica Salesiana, Grupo de Investigación en Energía<br>2. Universidad de Cuenca, Facultad de Arquitectura y Urbanismo Cuenca. Ecuador                                  |
|            | <b>PP:184-188</b>  |
| <b>251</b> | <b>The Fault Detection of Gears of Electromechanical Power Transmission System using Frequency Domain Approach</b><br><b>Alwadie. A(1), Muhammad Irfan(2), Nordin Saad(3)</b><br>1.2. Electrical Engineering Department, College of Engineering, Najran University. Saudi Arabia<br>3. Department of Electrical and Electronics Engineering, Universiti Teknologi PETRONAS, Perak. Malaysia                          |
|            | <b>PP:189-194</b>  |
| <b>252</b> | <b>A review on the integration between urban and energy planning considering the planning tools</b><br><b>L. F. C. Castro, B. B. Freitas, P. C. M. Carvalho</b><br>Department of Electrical Engineering, Federal University of Ceará. Brazil   |
|            | <b>PP:195-198</b>  |
| <b>253</b> | <b>Design of an active pitch control for small horizontal-axis wind turbine</b><br><b>J. Vilà(1), N. Luo(1), L. Pacheco(1), T. Pujol(2), J.R. Gonzalez(2), I. Ferrer(1) A. Massaguer(2), E. Massaguer(2)</b><br>1. Department of Electrical Engineering, Electronics and Automation, University of Girona. Spain<br>2. Department of Mechanical Engineering and Industrial Construction, University of Girona. Spain |
|            | <b>PP:199-204</b>  |
| <b>255</b> | <b>The energy-environmental efficiency of the existing building stock through morphological-constructive solutions: the case study of a single family building in Sicily</b><br><b>F. Blundo, F. Foti, F. Leone, F. Nocera, L. Savoca</b><br>Department of Civil Engineering and Architecture DICAR, University of Catania. Italy  |
|            | <b>PP:205-210</b>  |
| <b>258</b> | <b>Optimisation of Energy Accumulation for Renewable Energy Sources</b><br><b>Milan Belik</b><br>Department of Power Engineering Faculty of Electrical Engineering, University of West Bohemia, Pilsen. Czech Republic   |

|            |   |
|------------|---|
|            | <b>PP:211-216</b>   |
| <b>259</b> | <b>Novelty Detection on Power Quality Disturbances Monitoring</b><br><b>A. D. Gonzalez-Abreu(1), M. Delgado-Prieto(2), J.J. Saucedo-Dorantes(1), R. A. Osornio-Rios(1)</b><br>1. HSPdigital CA-Mecatronica Engineering Faculty, Autonomous University of Queretaro. Mexico<br>2. MCIA Research Center Department of Electronic Engineering, Technical University of Catalonia (UPC) Barcelona. Spain  |
|            | <b>PP:217-221</b>   |
| <b>260</b> | <b>Development of a power transformer model for high-frequency transient phenomena</b><br><b>L. Braña(1,2), A. Costa(2), R. Lopes(1)</b><br>1. Department of Research and Development Efacec Energia. Portugal<br>2. Department of Electrical Engineering FEUP, University of Porto. Portugal   |
|            | <b>PP:222-228</b>   |
| <b>262</b> | <b>Continuous cross-period single phase shift control for dual active bridge converters</b><br><b>Szabolcs Veréb, András Futó, Zoltán Süttö, Attila Balogh, István Varjasi</b><br>Power Electronics Research Group. Department of Automation and Applied Informatics. Budapest University of Technology and Economics. Hungary  |
|            | <b>PP:229-234</b>   |
| <b>264</b> | <b>Energy planning tools applied into urban photovoltaic: the importance of compatibilizing with the constructions</b><br><b>B. B. Freitas, L. F. C. Castro, P. C. M. de Carvalho</b><br>Department of Electrical Engineering Federal University of Ceará. Brazil   |
|            | <b>PP:235-240</b>   |
| <b>265</b> | <b>Automated Tool Based on Deep Learning to Assess Voltage Dips Validity: Integration in the QuEEN MV network Monitoring System</b><br><b>M. Zanoni, R. Chiumeo, L. Tenti, M. Volta</b><br>Ricerca sul Sistema Energetico – RSE S.p.A., Milano. Italy   |
|            | <b>PP:241-245</b>   |
| <b>267</b> | <b>Clustering Technique for Scenario Reduction in Post-Energy Transition Voltage Dips Assessment</b><br><b>R. Torkzadeh(1), J.B.M. van Waes(2), V. Čuk(1), J. F. G. Cobben(1)</b><br>1. Department of Electrical Engineering, Eindhoven Technical University (TU/e). The Netherlands<br>2. TenneT TSO B.V. The Netherlands  |
|            | <b>PP:246-250</b>   |
| <b>268</b> | <b>Bi<sub>6</sub>Te<sub>2-x</sub>R<sub>x</sub>O<sub>13</sub> (R=Ti, Si, Ce) Systems: A Investigation for Fuel Cell Applications</b><br><b>K. D. Ferreira(1), G. Gasparatto(2), G.P. Viajante(1), J.F. Carvalho(2)</b><br>1. Instituto Federal de Goiás, Itumbiara-Goiás. Brazil<br>2. Instituto de Física, Universidade Federal de Goiás, Goiânia-Goiás. Brazil   |
|            | <b>PP:251-256</b>   |
| <b>270</b> | <b>Design and Implementation of an IMC-1DOF Controller Applied to MPPT Photovoltaic Systems Using ZVS Full-Bridge DC-DC Converter</b><br><b>E. N. Chaves(1), G. P. Viajante(1), M. A.A. de Freitas(1), E. A. A. Coelho(2), M.E Oliveira(1), R. Nielson(3), L.G Wesz(1), G. Moraes(2)</b><br>1. Instituto Federal de Educação, Ciência e Tecnologia de Goiás, Itumbiara – GO. Brasil<br>2. Universidade Federal de Uberlândia, Uberlândia – MG. Brazil<br>3. Enel Distribuição Goiás. Brazil |
|            | <b>PP:257-262</b>   |
| <b>271</b> | <b>Hybridization of non-manageable renewable energy plants with compressed or</b>   |



|            |  |
|------------|--|
|            | <p><b>liquefied air storage</b><br/> <b>Fernando Soto Pérez(1), Antonio J. Gutiérrez Trashorras(1), Francisco J. Rubio Serrano(2), Jorge Xiberta Bernat(1)</b><br/>           1. Energy Department, Escuela Politécnica de Ingeniería, Universidad de Oviedo, Gijón, Asturias. Spain<br/>           2. Iberg y S.L., Pozuelo de Alarcón, Madrid. Spain</p> <p><b>PP:263-268</b></p>  |
| <b>272</b> | <p><b>Wind Action Analysis on Different Structures of Photovoltaic Systems Installed on Flat Rooftops of Buildings</b><br/> <b>D. G. N. M. Benchimol, J. L. Domingos, A. J. Alves</b><br/>           Experimental &amp; Technological Research and Study Group (NEXt) of Federal Institute of Goiás, Goiânia, Goiás. Brazil</p> <p><b>PP:269-275</b></p>   |
| <b>273</b> | <p><b>Modelling of solar thermal energy for household use in equatorial latitude by using the F-Chart model</b><br/> <b>Mateo Astudillo-Flores(1) , Esteban Zalamea-Leon(2), Antonio Barragán-Escandón(3) M.R.Pelaez Samaniego(4) , John Calle-Siguencia(5)</b><br/>           1. Dirección de Investigación de la Universidad de Cuenca<br/>           2. Faculty of Architecture, Univesidad de Cuenca, Cuenca-Ecuador<br/>           3. Faculty of Mechanical Engineering, Universidad Politécnica Salesiana, Cuenca -Ecuador<br/>           4. Faculty of Chemical Sciences, Universidad de Cuenca, Cuenca-Ecuador<br/>           5. Grupo de Investigación en Energía</p> <p><b>PP:276-281</b></p>  |
| <b>275</b> | <p><b>Solar Energy as an alternative source in boiler economizers</b><br/> <b>A. Daniel Pereira de Oliveira(1),B. Aylton Alves(1), Bárbara Morais Arantes(2)</b><br/>           1. I.F.G. Federal Institute of Education, Science and Technology of Goiás. Brazil<br/>           2. Ciências da Saúde, Universidade Federal de Goiás. Brazil</p> <p><b>PP:282-286</b></p>  |
| <b>276</b> | <p><b>Comparative Analysis of Dynamic Performance Between Switched Reluctance Motors 6x4 and 8x6</b><br/> <b>M.B.S.Pinto, G.P.Viajante, E.N. Chaves, M.A.A. Freitas, M.E Oliveira, J.A. Santos</b><br/>           Federal Institute of Education, Science and Technology of Goiás Energy Systems Research Center (Núcleo de Pesquisas em Sistemas de Energia - NuPSE) Goiás. Brazil</p> <p><b>PP:287-292</b></p>   |
| <b>278</b> | <p><b>Cycle-Life Curves Determination and Modelling of Commercially Available Electric Vehicle Batteries</b><br/> <b>G.Saldaña(1), J.I. San Martín(2), F.J. Asensio(2), I. Zamora(3), O. Oñederra(3), M. González-Pérez(2), I.J. Oleagordía(4)</b><br/>           1. Department of Systems and Automatic Engineering Engineering School of Bilbao, University of the Basque. Spain<br/>           2. Department of Electrical Engineering Engineering School of Gipuzkoa, University of the Basque Country, Eibar. Spain<br/>           3. Department of Electrical Engineering Engineering School of Bilbao, University of the Basque Country. Spain<br/>           4. Department of Electronic Technology Engineering School of Bilbao, University of the Basque Country. Spain</p> <p><b>PP:293-297</b></p> |
| <b>279</b> | <p><b>Integration of the Electric Vehicle into the Electrical Grid of the Future</b><br/> <b>M. González-Pérez(1), J.I. San Martín(1), F.J. Asensio(1), I. Zamora(2), O. Oñederra(2), G. Saldaña(3), I.J. Oleagordía(4)</b><br/>           1. Department of Electrical Engineering Engineering School of Gipuzkoa (Eibar),</p>   |

|            |   |
|------------|---|
|            | <p>University of the Basque Country. Spain</p> <p>2. Department of Electrical Engineering Engineering School of Bilbao, University of the Basque Country. Spain</p> <p>3. Department of Systems and Automatic Engineering Engineering School of Bilbao, University of the Basque. Spain</p> <p>4. Department of Electronic Technology Engineering School of Bilbao, University of the Basque Country. Spain</p>   |
|            | <b>PP:298-303</b>   |
| <b>280</b> | <p><b>Harmonic analysis PQM data in 150kV grid of TSO TenneT in Brabant, The Netherlands</b></p> <p><b>W.L. Broekman(1), J.B.M. van Waes(2), V. Ćuk(1), J.F.G. Cobben(1)</b></p> <p>1. Department of Electrical Engineering Eindhoven University of Technology. The Netherland.</p> <p>2. TSO TenneT B.V. Arnhem. The Netherlands</p>   |
|            | <b>PP:304-309</b>   |
| <b>282</b> | <p><b>Software for calculating the optimum tilt angle of PV modules in different latitudes of the Southern hemisphere and solar plant sizing</b></p> <p><b>Matheus M. Cabral, Sofia. A. Lemes, Marcelo E. de Oliveira, Paulo H. A. Silva e Silva, Ghunter P. Viajante</b></p> <p>Núcleo de Pesquisas em Sistemas de Energia - NuPSE Federal Institute of Education, Science and Technology of Goiás – IFG. Itumbiara, Goiás. Brazil</p>   |
|            | <b>PP:310-315</b>   |
| <b>283</b> | <p><b>Impacts of Photovoltaic Systems on a Brazilian Distribution Feeder using OpenDSS</b></p> <p><b>Eduardo Mateus Costa Santos de Oliveira, Marcelo Escobar de Oliveira, Luis Gustavo Wesz da Silva</b></p> <p>Núcleo de Pesquisas em Sistemas de Energia - NuPSE Federal Institute of Education, Science and Technology of Goias - IFG .Itumbiara – Goias .Brazil</p>  |
|            | <b>PP:316-320</b>   |
| <b>284</b> | <p><b>Power Quality Improvements in Grid-Connected PV System Using Hybrid Technology</b></p> <p><b>Prasad Kumar Bandahalli Mallappa, Herminio Martínez-García, Guillermo Velasco-Quesada</b></p> <p>Department of Electronic Engineering Escola d'Enginyeria de Barcelona Est (EEBE), Technical University of Catalonia (UPC)-BarcelonaTech. Spain</p>  |
|            | <b>PP:321-326</b>   |
| <b>286</b> | <p><b>Modelling of a Permanent Magnet Synchronous Motor and its Control Circuit in Simulink Environment</b></p> <p><b>Mihály Katona, Péter Kiss</b></p> <p>Department of Electric Power Engineering Budapest University of Technology and Economics Budapest. Hungary</p>   |
|            | <b>PP:327-332</b>   |
| <b>287</b> | <p><b>Heatsinks to Cool Batteries for Unmanned Aerial Vehicles</b></p> <p><b>J. Galvão(1,2), P. Faria,(3,5), A. Mateus(4,5), T. Pereira(4), S. Fernandes(6)</b></p> <p>1. Department of Electrical Engineering/ESTG, Polytechnic of Leiria. Portugal</p> <p>2. R&amp;D Unit, Institute for Systems Engineering and Computers /INESCCoimbra. Portugal</p> <p>3. Departments of Mathematics/ESTG, Polytechnic of Leiria. Portugal</p> <p>4. Department of Mechanical Engineering/ESTG, Polytechnic of Leiria. Portugal</p> <p>5. Centre for Rapid and Sustainable Product Development (CDRSP) of the Polytechnic of Leiria. Portugal</p> <p>6. TEKEVER/Autonomous Systems. Portugal</p> |
|            | <b>PP:333-337</b>   |

|            |  |
|------------|--|
| <b>288</b> | <b>New PV Metrology for performance appraisal of Poly-Silicon PV Modules in Eastern Indian climatic Zone</b><br><b>Debasish Majumdar(1), Sudipta Basu Pal (2), Rajiv Ganguly(1)</b><br>1. University of Engineering & Management, Kolkata. India<br>2. Computer Science Engineering Departments, University of Engineering & Management. Kolkata. India  |
|            | <b>PP:338-343</b>  |
| <b>290</b> | <b>SCADA Data-Driven Wind Turbine Main Bearing Fault Prognosis Based on One-Class Support Vector Machines</b><br><b>A. Insuasty(1), C. Tutivén(2,3,4), Y. Vidal(4,5)</b><br>1. Electronic Engineering Faculty of Engineering Universidad de Nariño. Colombia 2. Mechatronics Engineering Faculty of Mechanical Engineering and Production Science Escuela Superior Politecnica del Litoral, Guayaquil. Ecuador<br>3. Universidad ECOTEC Guayaquil. Ecuador<br>4. Control, Modeling, Identification and Applications Department of Mathematics Escola d'Enginyeria de Barcelona Est Universitat Politècnica de Catalunya, Barcelona. Spain<br>5. Institute of Mathematics (IMTech) Universitat Politècnica de Catalunya, Barcelona. Spain |
|            | <b>PP:344-349</b>  |
| <b>291</b> | <b>Neural Network Control of Green Energy Vehicles with Blended Braking Systems</b><br><b>V. Vodovozov(1), E. Petlenkov(2), A. Aksjonov(1), Z. Raud(1)</b><br>1. Department of Electrical Power Engineering and Mechatronics<br>2. Department of Computer Systems Tallinn University of Technology. Estonia  |
|            | <b>PP:350-355</b>  |
| <b>292</b> | <b>A comparative study of model fitting for estimating the overall efficiency of grid-connected photovoltaic inverters</b><br><b>J. Ramos-Teodoro(1) , F. Rodríguez(1) , M. Pérez(2), M. Berenguel(1)</b><br>1. Department of Informatics<br>2. Department of Chemistry and Physics CIESOL-ceiA3, University of Almería. Spain   |
|            | <b>PP:356-361</b>  |
| <b>293</b> | <b>Understanding Power Quality using IoT-based Smart Analyzers and Advanced Software Tools</b><br><b>A. Alcayde(1), F.G. Montoya(1), F.M. Arrabal-Campos(1), Jesús González(2), Andrés Ortiz(3), R. Baños(1)</b><br>1. Department of Engineering E.S.I., University of Almería. Spain<br>2. Department of Computer Architecture and Technology E.T.S.I.I., University of Granada. Spain<br>3. Department of Signal Theory, Networking and Communications, E.T.S.I.T., University of Malaga. Spain  |
|            | <b>PP:362-367</b>  |
| <b>295</b> | <b>Adaptive Notch Filter based WECS for Unbalance Mitigation</b><br><b>M.K. Abbas, M. Mokhtar, M.I. Marei, A.A.El-Sattar</b><br>Department of Electrical Power and Machines. Faculty of Engineering Ain Shams Universty, Cairo. Egypt  |
|            | <b>PP:368-372</b>  |
| <b>296</b> | <b>Design Overview of a Toroidal Fast-Field Cycling electromagnet</b><br><b>Joao T. Cunha(1), Pedro J. Sebastiao(1), António Roque(2,3), Vitor Vaz da Silva(4,5), Duarte M. Sousa(6)</b><br>1. CeFEMA, Instituto Superior Técnico , Lisboa. Portugal<br>2. Department of Electrical Engineering. ESTSetúbal/ Instituto Politécnico de Setúbal. Portugal  |

|            |   |
|------------|---|
|            | <p>3. INESC-ID. Portugal<br/>         4. ADEETC-ISEL, Instituto Politécnico de Lisboa. Portugal<br/>         5. CTS, Universidade Nova de Lisboa. Portugal<br/>         6. DEEC, AC Energia, Instituto Superior Técnico, Universidade de Lisboa. Portugal</p> <p><b>PP:373-378</b></p>  |
| <b>297</b> | <p><b>A Brief Introduction in the Mitigation of Conducted Electromagnetic Interference Issues</b><br/> <b>M. Buzdugan</b><br/>         Department of Buildings Engineering, Technical University of Cluj-Napoca. Romania</p> <p><b>PP:379-384</b></p>   |
| <b>298</b> | <p><b>Study of the second-generation of CdTe and CIGS thin film PV modules under natural sunlight conditions</b><br/> <b>K. Dyndal, J. Sanetra, K. Marszalek</b><br/>         Institute of Electronics, Faculty of Computer Science, Electronics and Telecommunications. AGH University of Science and Technology, Kraków. Poland</p> <p><b>PP:385-390</b></p>  |
| <b>299</b> | <p><b>Micromorph and polymorphous solar panel in a warm temperature transitional climate - comparison of outdoor performance and simulations</b><br/> <b>G. Lewhiska, K. Dyndal, J. Sanetra, K.W. Marszalek</b><br/>         AGH University of Science and Technology, Institute of Electronics, Krakow. Poland</p> <p><b>PP:391-395</b></p>  |
| <b>302</b> | <p><b>Performance evaluation of high-lift hydrofoils with a flap used in the design of horizontal-axis hydrokinetic turbines</b><br/> <b>Rubio-Clemente A.(1,2), Aguilar J.(2), Chica E.(2)</b><br/>         1. Facultad de Ingeniería, Universidad de Medellín. Colombia<br/>         2. Grupo de Investigación Energía Alternativa, Facultad de Ingeniería, Universidad de Antioquia, Medellín. Colombia</p> <p><b>PP:396-401</b></p>   |
| <b>303</b> | <p><b>Modelling of Stator Coil-To-Ground Faults in Induction Motor</b><br/> <b>Stanislav Kocman, Pavel Pecínka</b><br/>         Department of General Electrical Engineering, VŠB -Technical University of Ostrava<br/>         Czech Republic</p> <p><b>PP:402-406</b></p>   |
| <b>304</b> | <p><b>Loss Analysis Due to Influence of Harmonics in a Distribution System</b><br/> <b>R.M. Soares, M. E. Oliveira, M. A. A. Freitas, G.P. Viajante, E. N. Chaves</b><br/>         Núcleo de Pesquisas em Sistemas de Energia - NUPSE<br/>         IFG, Instituto Federal de Goiás. Brazil</p> <p><b>PP:407-412</b></p>   |
| <b>305</b> | <p><b>Analysis of an automotive thermoelectric generator coupled to an electric exhaust heater to reduce NOx emissions in a Diesel-powered Euro VI Heavy Duty vehicle</b><br/> <b>A. Massaguer(1), E. Massaguer(1), J. Ximinis(1), T. Pujol(1) M. Comamala(1), L. Montoro, J.R. González, P. Fernández-Yañez(2), O. Armas(2)</b><br/>         1. Department of Mechanical Engineering and Industrial Construction. E.P.S., Universitat de Girona. Spain<br/>         2. Universidad de Castilla-La Mancha. Campus de Excelencia Internacional en Energía y Medioambiente. Escuela de Ingeniería Industrial y Aeroespacial de Toledo. Spain</p> <p><b>PP:413-417</b></p> |
| <b>307</b> | <p><b>Unfavourable Reactive Power in a Rolling Mill</b></p>   |

|     |   |
|-----|---|
|     | <p><b>Stanislav Nowak, Stanislav Kocman</b><br/>Department of General Electrical Engineering VŠB - Technical University of Ostrava. Czech Republic</p>  |
|     | <p><b>PP:418-422</b></p>  |
| 308 | <p><b>Application of a central composite face-centered design in the optimization of an Archimedean hydrokinetic turbine</b><br/><b>J. Betancour(1), L. Velásquez(1), L.Y. Jaramillo(2), E. Chica(1), A. Rubio-Clemente(1,2)</b><br/>1. Grupo de Investigación Energía Alternativa, Facultad de Ingeniería, Universidad de Antioquia. Colombia<br/>2. Facultad de Ingeniería, Tecnológico de Antioquia-Institución Universitaria TdeA Medellín. Colombia</p>  |
|     | <p><b>PP:423-428</b></p>  |
| 309 | <p><b>The behaviour of a low voltage distribution network with crescent presence of photovoltaic generation and energy storage elements</b><br/><b>Rafael Martins Leite, Jonas Villela de Souza, Eduardo Nobuhiro Asada, Mário Oleskovicz</b><br/>Department of Electrical and Computer Engineering, Sao Carlos Engineering School, University of Sao Paulo. Brazil</p>   |
|     | <p><b>PP:429-434</b></p>  |
| 310 | <p><b>Reducing the carbon footprint of Whisky production through the use of electricity and heat storage alongside renewable generation</b><br/><b>Wolf-Guerrit Früh(1), Jamie Hillis(2), Sandy Gataora(2), Dawn Maskell(3)</b><br/>1. Institute of Mechanical, Process and Energy Engineering, School of Engineering &amp; Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh, Scotland. United Kingdom<br/>2. Sunamp Ltd<br/>3. International Centre for Brewing &amp; Distilling, School of Engineering &amp; Physical Sciences, Heriot-Watt University, Riccarton, Edinburgh. United Kingdom</p> |
|     | <p><b>PP:435-440</b></p>  |
| 312 | <p><b>Dual-Axis Tracking Electrical Drives for Solar Power Tower</b><br/><b>W. M. Hamanah(1), A. Salem(1), M. A. Abido(1,2), T. G. Habetler(3), A.M. Qwbaiba(3)</b><br/>1. Department of Electrical Engineering, King Fahd University for Petroleum and Minerals, Dhahran. KSA<br/>2. K.A.CARE Energy Research &amp; Innovation Center (ERIC), King Fahd University for Petroleum and Minerals. KSA<br/>3. School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta. USA</p>   |
|     | <p><b>PP:441-446</b></p>  |
| 314 | <p><b>Fuses in distribution systems: new applications in DC circuits</b><br/><b>J. C. Gómez, D. Toum, C. Reineri, F. Romero</b><br/>Department of Electrical and Electronic Engineering, IPSEP, Rio Cuarto National University, Córdoba. Argentina</p>  |
|     | <p><b>PP:447-451</b></p>  |
| 316 | <p><b>Convolutional Neural Network for Wind Turbine Failure Classification Based on SCADA Data</b><br/><b>B. Puruncajas(1,2), W. Alava(1), Encalada Dávila(1) C. Tutivén(1,2), Y. Vidal(2,3)</b><br/>1. Mechatronics Engineering, Faculty of Mechanical Engineering and Production Science, Escuela Superior Politécnica del Litoral, Guayaquil. Ecuador<br/>2. Control, Modeling, Identification and Applications Department of Mathematics Escola d'Enginyeria de Barcelona Est, Universitat Politècnica de Catalunya. Spain</p>  |

|            |   |
|------------|---|
|            | 3. Institute of Mathematics (IMTech) Universitat Politècnica de Catalunya. Barcelona. Spain   |
|            | <b>PP:452-458</b>   |
| <b>317</b> | <b>Design of a LLC Resonant Converter for Powering a PEM Electrolyzer</b><br><b>G. Vitale(1), F. Castaldi(2), D. Guilbert(3)</b><br>1. ICAR, Institute for high performance computing and networking, National Research Council of Italy, Palermo. Italy<br>2. Department of Engineering, University of Palermo, Viale delle Scienze, Palermo. Italy<br>3. Université de Lorraine, GREEN,Nancy. France  |
|            | <b>PP:459-464</b>   |
| <b>318</b> | <b>Shared PV Production in Energy Communities and Buildings Context</b><br><b>Sérgio Ramos, Zabra Foroozandeh, João Soares, Inés Tavares, Pedro Faria, Zita Vale</b><br>GECAD - Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development, Polytechnic of Porto (ISEP/IPP), Portugal  |
|            | <b>PP:465-470</b>   |
| <b>320</b> | <b>Intelligent Resource Management in the context of a Microgrid of Smart Buildings</b><br><b>Sérgio Ramos, João Soares, Zahra Foroozandeh, Inés Tavares, António Gomes</b><br>GECAD - Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development Polytechnic of Porto (ISEP/IPP). Portugal  |
|            | <b>PP:471-476</b>   |
| <b>321</b> | <b>The contribution of experimental energy facilities to the achievement of SDG in their environment: the case of IFMIF-DONES</b><br><b>Rafael Esteban López(1), Zaida Troya(1), Virginia Fernández-Pérez(1,2), Antonio Peña-García(3)</b><br>1. "DONES Preparatory Phase" (CE Ref. 870186) Project Vicerrectorate of Research - University of Granada. Spain<br>2. Dpt. Business Organisation, Faculty of Economics and Business, University of Granada. Spain<br>3. Department of Civil Engineering & Co-PI UGR "DONES Preparatory Phase" (CE Ref. 870186) University of Granada. Spain |
|            | <b>PP:477-482</b>   |
| <b>322</b> | <b>Detection of the initial region of the current transformer core saturation</b><br><b>I. Odinaev, Andrew V. Pazderin, Pavel. V. Murzin, Valeriy A. Tashchilin, Vladislav O. Samoylenko, B. Ghoziev</b><br>Department of Automated Electrical Systems, Ural Federal University. Yekaterinburg. Russia  |
|            | <b>PP:483-486</b>   |
| <b>323</b> | <b>Protection of Power Semiconductors in Inverters, using Fuses and their Coordination with the Protection Schemes of the Distribution System</b><br><b>J. C. Gómez, J. Vaschetti, M. Piumetto, J. Arcurio, C. Coyos</b><br>Department of Electricity. CIDTIEE, Technological National University. Argentina  |
|            | <b>PP:487-492</b>   |
| <b>325</b> | <b>Wind Turbine Multi-Fault Detection based on SCADA data via an AutoEncoder</b><br><b>Á. Encalada-Dávila(1), C.Tutivén(1), B. Puruncajas(1), Y. Vidal(2,3)</b><br>1. Mechatronics Engineering, Faculty of Mechanical Engineering and Production Science, Escuela Superior Politécnica del Litoral, Guayaquil. Ecuador<br>2. Control, Modeling, Identification and Applications, Department of Mathematics Escala d'Enginyeria de Barcelona Est, Universitat Politècnica de Catalunya. Spain<br>3. Institut de Matemàtiques de la UPC - BarcelonaTech, IMTech. Spain                      |
|            | <b>PP:493-498</b>   |

|            |   |
|------------|---|
| <b>327</b> | <b>Three-phase Quaternion Power in Three-wire Systems</b><br><b>André S. F. Komeno, Anésio L. F. Filho, João Y. Ishihara, Victor P. Brasil</b><br>Department of Electrical Engineering, University of Brasilia. Brazil  |
|            | <b>PP:499-504</b>   |
| <b>329</b> | <b>Distribution Grid Future Planning Under Uncertainty Conditions</b><br><b>V. Samoylenko(1), A. Firsov(1), A. Pazderin(1), P. Ilyushin(2)</b><br>1. Department of Automated Electrical Systems, Ural Federal University. Yekaterinburg. Russia<br>2. Energy Research Institute, Russian Academy of Sciences, Moscow. Russia  |
|            | <b>PP:505-510</b>   |
| <b>330</b> | <b>Airfoil optimization for small horizontal axis wind turbine</b><br><b>Cristhian Leonardo Pabón Rojas(1), Carlos Andrés Trujillo Suarez(1), Juan Carlos Serrano Rico(2), Elkin Gregorio Flórez Serrano(2)</b><br>1. Mechanical Engineering Program, Engineering Faculty, Universidad de Antioquia. Colombia<br>2. Mechanical Engineering Program, Faculty of Engineering and Architecture. Universidad de Pamplona. Colombia  |
|            | <b>PP:511-516</b>   |
| <b>332</b> | <b>Techno-economic assessment of the use of Linear Fresnel Solar Collectors for the supply of heat in traditional fruits and vegetable processing industries in Almeria's province</b><br><b>J.D. Gil(1,2,3), J.A. Romero Ramos(3), M. Pérez García(1,2,3), M. Martínez Molina(1,2,3), J. Roperó(3), A. Rodríguez(3)</b><br>1. CIESOL Research Center on Solar Energy, joint center UAL-CIEMAT.<br>2. Automatic Control, Robotics and Mechatronics group. University of Almería<br>3. School of Engineering. University of Almería. Spain |
|            | <b>PP:517-522</b>   |
| <b>333</b> | <b>Power Quality Impacts of PV Systems Integration on Petroleum Development Ornan (PDO) - Mina Al-Fahal (MAF) Distribution Network</b><br><b>Faiza Al-Harhi(1), Mohammed Albadi(1), Rashid Al-Abri(1,2), Abdullah Al-Badi(1)</b><br>1. Department of Electrical & Computer Engineering<br>2. Sustainable Energy Research Center. Sultan Qaboos University, Muscat. Oman   |
|            | <b>PP:523-527</b>   |
| <b>335</b> | <b>Permanent Closed-Loop Operation as a Measure for Improving Power Supply Reliability in a Rural Medium Voltage Distribution Network</b><br><b>G. Štumberger(1), M. Rošer(2), B. Polajžer(1)</b><br>1. Faculty of Electrical Engineering and Computer Science, University of Maribor. Slovenia<br>2. Elektro Celja d.d. Celje. Slovenia  |
|            | <b>PP:528-533</b>   |
| <b>337</b> | <b>Automatic Detection of Voltage Notches using a Support Vector Machine</b><br><b>Rongzhen Qi, Olga Zyabkina, Daniel Agudelo Martinez, Jan Meyer</b><br>Institute of Electrical Power Systems and High Voltage Engineering<br>Technische Universitiit Dresden. Germany   |
|            | <b>PP:534-539</b>   |
| <b>339</b> | <b>Wind Energy Education through Low-Power Wind Turbines and Advanced Software Tools</b><br><b>R. Baños(1), A. Alcayde(1), F.G. Montoya(1), F.M. Arrabal-Campos(1), A.J. Jara(2)</b><br>1. Department of Engineering. E.S.I., University of Almería. Spain<br>2. HOP Ubiquitous SL. Murcia. Spain   |

|            |   |
|------------|---|
|            | <b>PP:540-545</b>   |
| <b>340</b> | <b>Impact on the Spanish electricity network due to the massive incorporation of electric vehicles</b><br><b>Francisco M. Arrabal-Campos, Juan Martínez-Lao, Francisco G. Montoya, Alfredo Alcayde, Raúl Baños</b><br>Department of Engineering, E.S.I., University of Almeria. Spain   |
|            | <b>PP:546-551</b>   |
| <b>341</b> | <b>Robust-PCA Deep Learning for PQ disturbances classification using Synchrosqueezing Wavelet Transform</b><br><b>Francisco M. Arrabal-Campos, Alfredo Alcayde, Francisco G. Montoya, Juan Martínez-Lao, Javier Castillo-Martínez, Raúl Baños</b><br>Department of Engineering, E.S.I., University of Almeria. Spain  |
|            | <b>PP:552-556</b>   |
| <b>343</b> | <b>Comparative study of photovoltaic self-consumption alternatives considering the Spanish legal framework</b><br><b>S. de la Torre(1), J. Á. Lagos(2)</b><br>1. Departamento de Ingeniería Eléctrica, Universidad de Málaga. Spain<br>2. Departamento de Innovación, Iberdrola S.A. Spain  |
|            | <b>PP:557-560</b>   |
| <b>344</b> | <b>Fast frequency oscillations detection in low inertia power systems with excessive demand-side response for frequency regulation</b><br><b>Leo Casasola-Aignesberger, Sergio Martinez</b><br>Department of Electrical Engineering, Escuela Técnica Superior de Ingenieros Industriales, Universidad Politécnica de Madrid. Spain  |
|            | <b>PP:561-564</b>   |
| <b>346</b> | <b>Installing green artificial reefs: a sustainable challenge</b><br><b>Alicia Munín-Doce(1), Laura Castro-Santos(1), Luis Carral(1), Juan José Cartelle-Barros(2), Carolina Camba-Fabal(1), Javier Tarrío-Saavedra(3)</b><br>1. Universidade da Coruña, Departamento de Enxeñaría Naval e Industrial Escola Politécnica Superior, Ferrol. Spain<br>2. Universidade da Coruña, Departamento de Economía, Facultad de Economía y Empresa, A Coruña. Spain<br>3. Universidade da Coruña, Departamento de Matemáticas Escola Politécnica Superior. Ferrol. Spain |
|            | <b>PP:565-570</b>   |
| <b>347</b> | <b>IoT Monitoring System for Applications with Renewable Energy Generation and Electric Drives</b><br><b>Maria G. Ioannides(1), Anastasios Stamelos(1), Stylianos A. Papazis(2), Athanasios Papoutsidakis(1), Vasilios Vikentios(1), Nikolaos Apostolakis(3)</b><br>1. Electrical and Computer Engineering, National Technical University of Athens. Greece<br>2. Electrical and Computer Engineering, Democritus University of Thrace. Greece<br>3. School of Telematic Engineering, Universidad Carlos III de Madrid. Spain                                 |
|            | <b>PP:571-576</b>   |
| <b>351</b> | <b>Improving the overall thermal performance of parabolic trough solar collectors using porous media</b><br><b>H. Ebadi(1), A. Cammi(2), L. Savoldi(1)</b><br>1. MAHTEP Group, Dipartimento Energia "Galileo Ferraris" (DENERG), Politecnico di Torino. Italy<br>2. Department of Energy, Politecnico di Milano. Italy  |



|            |  |
|------------|--|
|            | <b>PP:577-582</b>  |
| <b>352</b> | <b>Impact of harmonic distortion on the supraharmonic emission of pulse-width modulated single-phase power electronic devices</b><br><b>E. Kaufhold, J. Meyer, P. Schegner</b><br>Institute of Electrical Power Systems and High Voltage Engineering, Technische Universitaet Dresden. Germany   |
|            | <b>PP:583-588</b>  |
| <b>353</b> | <b>Techno-Economic Assessment of Concentrated Solar and Photovoltaic Power Plants in Brazil</b><br><b>Guilherme de Sousa Torres(1), Tulio Andre Pereira de Oliveira(1), Anesio de Leles Ferreira Filho(1), Fernando Cardoso Melo(1), Elder Geraldo Domingues(2)</b><br>1. Department of Electrical Engineering, University of Brasilia. Brazil<br>2. Engineering College, Federal Institute of Goias. Brazil |
|            | <b>PP:589-592</b>  |
| <b>355</b> | <b>Role of honeycomb structure in improving the melting process of a phase change material inside a latent heat storage unit</b><br><b>M. Hariss, M. El Alami , A. Gounni</b><br>Physics Department, LPMMAT Laboratory. Faculty of Sciences Ain Chock, Hassan II University, Casablanca. Morocco   |
|            | <b>PP:593-597</b>  |
| <b>356</b> | <b>Solar Carport</b><br><b>Péter Kádár(1), Robert Istók(1), Levente Reizer(2)</b><br>1. Óbuda University, Dept. of Power Systems, Alternative Energy Sources. Knowledge Centre, Budapest. Hungary<br>2. Premium Napelem Kft .Budapest. Hungary   |
|            | <b>PP:598-603</b>  |
| <b>358</b> | <b>Real-Time Experimental Assessment of a New MPPT Algorithm Based on the Direct Detection of the Short-Circuit Current for a PV System</b><br><b>C. B. Nzoundja Fapi(1,2), P. Wira(2), M. Kamta(1)</b><br>1. LESIA Laboratory, ENSAI, University of Ngaoundere. Cameroon<br>2. IRIMAS Laboratory, University of Haute Alsace. France  |
|            | <b>PP:604-608</b>  |
| <b>360</b> | <b>Determination PV module technical condition</b><br><b>M. Belik(1), O. Rubanenko(2)</b><br>1. Department of Electrical Power Engineering and Ecology, University of West Bohemia, Pizen. Czech Republic<br>2. Department of Electric Stations and Systems, Vinnytsia National Technical University . Ukraine   |
|            | <b>PP:609-613</b>  |
| <b>361</b> | <b>Wind energy system in Ambocas-Ecuador: distributed generation and energy quality</b><br><b>O. Cabeza-Gras(1), V. Jaramillo-García(2)</b><br>1. Department of Physics and Earth Sciences, University of Coruña. Spain<br>2. Electrical Engineering. Faculty of Engineering, Universidad Laica Eloy Alfaro de Manabí (ULEAM). Ecuador   |
|            | <b>PP:614-618</b>  |
| <b>364</b> | <b>The inclusion of Power Gyrtator Topologies as Energy Processing Cells in Photovoltaic Solar Conversion.</b><br><b>Herminio Martínez-García, Encarna García-Vilchez</b><br>Department of Electronic Engineering, Escola d'Enginyeria de Barcelona Est (EEBE), Technical University of Catalonia (UPC)-BarcelonaTech. Spain   |

|            |  |
|------------|--|
|            | <b>PP:619-623</b>  |
| <b>365</b> | <b>Effects of pulse frequency on performance of electrochemical cooling water treatment for cooling tower of water-cooled chiller</b><br><b>Le Minh Nhut(1), Duong Huynh Minh Nhut(2)</b><br>1. Department of Thermal Engineering, Ho Chi Minh City University of Technology and Education. Vietnam<br>2. College of Technology, Ho Chi Minh City. Vietnam |
|            | <b>PP:624-629</b>  |
| <b>367</b> | <b>Design factors in concentrating solar power plants for industrial steam generation</b><br><b>M.T. Miranda, D. Larra, I. Montero, F.J. Sepúlveda, J.I. Arranz, C.V. Rojas</b><br>Department of Mechanical, Energy and Materials Engineering Industrial Engineering School, University of Extremadura, Badajoz. Spain                                     |
|            | <b>PP:630-635</b>  |
| <b>368</b> | <b>Optimal sizing design of a 1.5 MW permanent magnets synchronous generator for an onshore wind conversion system</b><br><b>H. Gallas(1,2), S. Le Ballois(1), H. Aloui(2), L. Vido(1)</b><br>1. SATIE Laboratory, SETE team, CY Cergy Paris University, Cergy-Pontoise. France<br>2. ESSE Laboratory, ISEM team, ENET'COM, Sfax. Tunisia                  |
|            | <b>PP:636-640</b>  |
| <b>369</b> | <b>An analytic model of the CSI</b><br><b>Jan Iwaszkiewicz, Adam Muc</b><br>Department of Electrical Engineering Gdynia Maritime University, Poland  |
|            | <b>PP:641-646</b>  |
| <b>370</b> | <b>Vector control strategy of the five-phase VSI</b><br><b>Jan Iwaszkiewicz, Adam Muc</b><br>Department of Electrical Engineering Gdynia Maritime University, Poland   |
|            |  |