

# **2014 International Renewable and Sustainable Energy Conference**

## **(IRSEC 2014)**

**Ouarzazate, Morocco**  
**17-19 October 2014**



**IEEE Catalog Number:** CFP1460U-POD  
**ISBN:** 978-1-4799-7337-8

## Contents

<b>A PSO algorithm for the calculation of the series and shunt resistances of the PV panel one-diode model</b>	1
<i>J. C. Sánchez Barroso, J. P. M. Correia, N. Barth, S. Ahzi, M. A. Khaleel</i>	
<b>Experimental analysis of genetic algorithms based MPPT for PV systems</b>	7
<i>Slimane HADJI, Jean-Paul GAUBERT, Fateh KRIM</i>	
<b>Sliding Mode Control Optimization and Comparison between PI,Fuzzy and Fuzzy PI controllers Photovoltaic current injected to Grid</b>	13
<i>Abdelhalim Borni, Layachi Zaghiba</i>	
<b>The MPPT Control of PV System by Using Neural Networks Based on Newton Raphson Method</b>	19
<i>NAOUFEL KHALDI, HASSAN MAHMOUDI, MALIKA ZAZI, YOUSSEF BARRADI</i>	
<b>Modeling and Simulation of Photovoltaic Array with Different Interconnection Configurations under Partial Shading Conditions for Fill Factor Evaluation</b>	25
<i>S. Hamdi, D. Saigaa, M. Drif</i>	
<b>Optimization of a ZnO/PbS Depleted Heterojunction Quantum Dot Photovoltaic Cell</b>	32
<i>Matthew Philip, Nick Cowern</i>	
<b>Energy Production in PV plants regarded as economic investments - An assessment for PV investments in Germany, Spain and Morocco</b>	37
<i>Inmaculada Guaita-Pradas, Bernabe Mari Soucase</i>	
<b>Analytical Calculation of Photocurrent Density in CIGS Double Graded Solar Cell</b>	42
<i>El hassane Ihalane, Lahoucine Atourki, Lahbib Alahyane, Lahcen Boulkaddat, El houcine El hamri, Hassan Kirou, Ahmed Ihlal, Khalid Bouabid</i>	
<b>Effect of cracking and aggregation on the efficiency of DSSC</b>	46
<i>Abdelhafed Taleb, Frederic Mesguish, Xue Yanpeng</i>	
<b>A Fuzzy Logic MPPT for Photovoltaic Systems using Single Sensor</b>	52
<i>Abdourraziq Mohamed Amine, Maaroufi Mohamed, Mohammed Ouassaid</i>	
<b>Effect of substrate temperature on physical properties of In<sub>2</sub>S<sub>3</sub> films with [S]/[In] =3 ratio</b>	57
<i>S. Elfarrass, B. Hartiti, A. Ridah, P. Thevenin</i>	
<b>Preparation and characterization of Al doped ZnO thin films by spray pyrolysis</b>	61
<i>Adil Hadri, Mohamed Loghmarti, Ahmed Mzerd, Mhamed Taibi</i>	
<b>Characterization of ZnO Thin Films Grown by Linear Sweep Voltammetry</b>	66
<i>Lahoucine Atourki, El hassane Ihalane, Hassan Kirou, El houcine El hamri, Ahmed Ihlal, Laarbi Laanab, Khalid Bouabid</i>	
<b>Transient thermal analyze of mini heat sink PV cells cooling for hot climate</b>	70
<i>Lahoucine Ouhaine, Abdelaziz Mimet, Mohammed El Ganaoui, Angel Scipioni, Yassine Kharbouch</i>	
<b>Contribution to solar concentrators design for photovoltaic application</b>	78
<i>Ali Ahaitouf, Christyves Chevallier, Jean Paul Salvestrini, Abdallah Ougazzaden</i>	
<b>Structural and optical properties of ZnO thin films prepared by spin coating method</b>	82
<i>Ghizlan El Hallani, Nejma Fazouan, Ahmed Liba, Larbi Laanab</i>	
<b>In<sub>2</sub>S<sub>3</sub> BUFFER LAYER PREPARED BY CHEMICAL BATH DEPOSITION</b>	85
<i>Lahoucine Atourki, Khalid Bouabid, Ahmed Ihlal, El hassane Ihalane, Youssef Amira, Abdeslam Elfanaoui, Hassan Kirou, Abdelkader Outzourhit, Xavier Portier</i>	
<b>One step electrodeposited CZTS thin films: Preparation and characterization</b>	89
<i>T. Slimani Tlemçani, F. Cherkaoui El Moursli, M. Taibi, F. Hajji, E.B. Benamar, S. Colis, G. Schmerber, D. Muller, A. Slaoui, A. Dinia, M. Abd-Lefdil</i>	
<b>ZnO Nanocactus Loaded with Gold Nanoparticles for Dye Sensitized Solar Cells</b>	94
<i>Shubhangi S. Khadtare, Abu Saad A. Ansari, Sandesh R. Jadkar, Shrikrishna D. Sartale, Habib</i>	

<i>M. Pathan</i>	
<b>Eosin-Y (EY), Rose Bengal (RB) and EY-RB Sensitized ZnO Solar Cells</b>	97
<i>Shubhangi S. Khadtare, Sandesh R. Jadkar, K.N. Hui, Rajaram S. Mane, Habib M. Pathan</i>	
<b>Shading Efficiency Calculation For Linear Fresnel Reflector</b>	100
<i>Youssef Elmaanaoui, Denoun Saifaoui</i>	
<b>Parametric analysis of end loss efficiency in linear Fresnel reflector</b>	104
<i>Youssef Elmaanaoui, Denoun Saifaoui</i>	
<b>A 3 MWth parabolic trough CSP plant operating with air at up to 650 °C</b>	108
<i>Giw Zanganeh, Gianluca Ambrosetti, Andrea Pedretti, Simone Zavattoni, Maurizio Barbato, Philipp Good, Andreas Haselbacher, Aldo Steinfeld</i>	
<b>Deposition of Transparent Aluminum Oxide (<math>\text{Al}_2\text{O}_3</math>) Films on Silvered CSP Mirrors</b>	114
<i>Houda Ennaceri, Dounya Barrit, Asmae Khaldoun, Abdelilah benyoussef, Ahmed Ennaoui</i>	
<b>Ageing study of thermal heat transfer fluids used in solar thermal power plants based on Fresnel Collector technology</b>	120
<i>Hind Girate, Nadia Zari, Abdellah Elmchaouri, Mohamed Maaroufi, Sophie Molina, Raphael Couturier</i>	
<b>Research on component materials used for Moroccan CSP power plants - Mirrors ageing and thermal storage</b>	125
<i>Zineb EDFOUF, Mohamed GUERGUER, Sanae NAAMANE, Mounia KARIM, Nadia ZARI, Hind GRIRATE, Olivier RACCURT, Christine DELORD, Raphael COUTURIER</i>	
<b>Composites of Zinc Phosphate Glass/Metal: New Materials for Thermoelectricity and Solar Cell Devices</b>	131
<i>O. OABI, A. MAAROUFI, B. LUCAS, S. DEGOT, A. EL AMRANI</i>	
<b>Fuzzy Logic of Speed Control for Photovoltaic Pumping System</b>	136
<i>Hamza Bouzeria, Cherif Fetha, Tahar Bahi, Salima Lekhchine, Zakaria Layate</i>	
<b>Heat transfer from multiple cylinders during melting process: Solar applications</b>	141
<i>Kousksou Tarik, Mahdaoui Mustapha, Hlimi Mohamed, Jamil Abdelmajid, El Rhafiki Tarik</i>	
<b>Optimization of Solar Updraft Tower by Using Heliostat Designed According to the Physiography of Sabha City</b>	147
<i>Ahmed Alamin, Danardono Prija, Suyitno Techn</i>	
<b>Maximum Power Point Tracking using Dual PI Fuzzy Controller for Photovoltaic System</b>	152
<i>DERRI Mounir, BOUZI Mostafa, LAGRAT Ismail, BABA Youssef</i>	
<b>Evaluation of Potential Solar Irradiance on Fixed and Two-Axes Solar Panel in Morocco</b>	157
<i>Radouan Ajdid, Mohammed Ouassaid, Mohamed Maaroufi</i>	
<b>Performance analysis of different extraction strategies of the maximum power in PV systems</b>	163
<i>Touria HASSEOUN, Youness AITE DRISS, Lhoussain EL BAHIR, Mustapha EL ADNANI</i>	
<b>Optimization of a Solar Tracker for CPV System - Principles and Practical Approach</b>	169
<i>Merouan Belkasm, Khalid Bouziane, Mohammed Akherraz, Tayeb Sadiki</i>	
<b>Solar tracking systems for solar concentrator field of heliostats – Innovation, performance and adaptation to small-scale applications</b>	175
<i>LOUDADI Mounir, EL OMARI Hamid</i>	
<b>Optimizing the Performance of a Solar Cell Based on New Materials</b>	181
<i>Abdelkader Aissat, A. Moumene Benhmed, Rachid Bestam, Jean Pierre Vilcot</i>	
<b>Integration of Supercapacitor in Photovoltaic Energy Storage: Modelling and Control</b>	185
<i>Zineb Cabrane, Mohammed Ouassaid, Mohamed Maaroufi</i>	
<b>Synchronization Techniques benchmarking of grid fault modes in single-phase Systems</b>	191
<i>Hicham FADIL, Driss YOUSFI, Youness AITE DRISS, Abd Rahim NASRUDIN</i>	
<b>A new MPPT using Gradient Method for Grid-Connected PV Inverter</b>	197
<i>Faichel EL AAMRI, Hattab MAKER, Azeddine MOUHSEN, Mohamed HARMOUCHI</i>	
<b>Design and implementation of MPPT solar system based on enhanced P&amp;O algorithm using Labview</b>	203

<i>GAGA Ahmed,ERRAHIMI Fatima, ES-SBAI Najia</i>	
<b>DC / DC converters for Photovoltaic Applications-Modeling and Simulations</b>	209
<i>Zakaria SABIRI, Nadia MACHKOUR, Elm'kadid KHEDDIOUI, Mamadou Bailo CAMARA, Brayima DAKYO</i>	
<b>Verification &amp; Validation of Simulation Code for Linear Fresnel Systems</b>	214
<i>Sara Benyakhlef, Ahmed Al Mers, Abdelfattah Bouatem,Noureddine Boutammachte, Ossama Merroun</i>	
<b>Heat transfer model of a trough compound parabolic reflector used in a linear Fresnel solar field</b>	219
<i>Hamid Ajdad, Noureddine Boutammachte, Ahmed Al Mers, Abdelfattah Bouatem, Ossama Merroun</i>	
<b>Modeling and Design of PV Grid Connected System Using a Modified Fractional Short-Circuit Current MPPT</b>	224
<i>Abdelhalim Sandali, Tarik Oukhoya, Ahmed Cheriti</i>	
<b>Environmental Variables Affecting Solar Photovoltaic Energy Generation in Morocco</b>	230
<i>Parikhit Sinha, William Hayes, Bodo Littmann, Lauren Ngan, Reda Znaidi</i>	
<b>A comparative study between two structures of hybrid photovoltaic/thermal (PV/T) collectors for water pumping systems</b>	235
<i>M. HAJJI, S. E. NAIMI, B. HAJJI, M. L. EL HAFYANI</i>	
<b>Optimal tilt angle and size of solar systems matching investor's strategy with seasonal needs</b>	241
<i>Amin Bennouna</i>	
<b>Surface wear damage of glass solar mirrors in Moroccan desert environment</b>	246
<i>Mounia. Karim, Sanae. Naamane, Christine Delord, Amine. Bennouna</i>	
<b>Long-Term PV System Performances Evaluation by Only the Main Weather Parameters Data uses. Case of Study: Desert and arid climate</b>	252
<i>Mustapha Koussa, Seddik Hadji, Saheb Djohra</i>	
<b>Outdoor testing effect of sand on photovoltaic module in the Saharan region</b>	258
<i>F. Bandoua, A. Hadj Araba, M.S. Belkaidb, P.O. Logeraisc</i>	
<b>Impact of STATCOM on a wind farm into the Western of Algerian network</b>	262
<i>Guenri Hocine, Lakdja Fatiha, Y.A. Gherbi, Djaffar Ould Adbsallem</i>	
<b>Variable Speed Control of DFIG-Wind Turbine with Wind Estimation</b>	268
<i>Youssef MAJDOUB, Ahmed ABBOU, Mohamed AKHERRAZ</i>	
<b>Robust and Simple Yaw Controller Design for a Low Power Wind Turbine through the Shuffled Frog Leaping Algorithm</b>	275
<i>Nedim Tutkun, Dincer Maden, Erdem Elibol</i>	
<b>On the use of small wind turbine in design and innovation education</b>	281
<i>Khadija Hmina, Abdelaziz Arbaoui, Mohammed Sallaou, Larbi Lasri</i>	
<b>Utilising Renewable Energy Subsides in the Integration of Energy Sectors</b>	287
<i>Victor Maxwell, Madalina Marilena Jogaru</i>	
<b>Optimal Sizing and placement of Renewable energy Source in large scale Power System using ABC technique in presence of UPFC</b>	294
<i>Sebaa Haddi, Khaled R.Guerriche, Bouktir Tarek</i>	
<b>Variable Structure Control Approach for Grid Connected PMSG Wind Farm</b>	300
<i>Youssef Errami, Mohammed Ouassaid, Mohamed Maaroufi</i>	
<b>Trends in grid integration of renewables. Case of Doubly Fed induction wind generator</b>	306
<i>Salma EL AIMANI</i>	
<b>Evaluation of three methods for estimating annual and seasonal wind speed distributions</b>	311
<i>Razika Ihaddadene, Nabila Ihaddadene, Marouane Mostefaoui</i>	
<b>Non-Linear Control and Transient Stability of SCAG Connected to Unbalanced AC Network</b>	317
<i>Kamal Elyaalaoui, Mohammed Ouassaid, Mohammed Cherkaoui</i>	
<b>Analysis of wake impact on wind farm performance using two analytical models</b>	323
<i>Naima Charhouni, Abdelaziz Arbaoui, Mohammed Sallaou</i>	

<b>A new sensorless Maximum Power Point Tracking technologies of wind conversion chain based on a PMSG</b>	328
<i>Amina ECHCHAACHOUAI, Soumia EL HANI, Ahmed HAMMOUCH, Said GUEDIRA</i>	
<b>Direct Torque Control of a Doubly Fed Induction Generator of Wind Turbine for Maximum Power Extraction</b>	334
<i>Anass Bakouri, Ahmed Abbou, Hassan Mahmoudi, Kamal Elyaalaoui</i>	
<b>Modeling and controlling of a wind turbine generator based on the Permanent Magnet Synchronous Machine</b>	340
<i>Walid SOULOUH, Hicham HIHI, Khalid FAITAH</i>	
<b>Extended Kalman Filter for characterizing a Wind Energy Conversion System based on Variable Speed Permanent Magnet Synchronous Generator</b>	346
<i>Abdelouahed Mesbahi, Abdelhadi Raihani, Omar Bouattane, Abdellah Saad, Mohamed Khafallah</i>	
<b>Analysis of Different Converters Used In Wind Energy Conversion System</b>	352
<i>Abdeldjalil DAHBI, Nasreddine NAIT-SAID, Messaoud HAMOUDA, Fatima Zohra ARAMA</i>	
<b>HOMER Analysis for Integrating Wind Energy into the Grid in Southern of Algeria</b>	360
<i>Djohra SAHEB KOUSSA, Mustapha KOUSSA</i>	
<b>Sensorless Direct Torque Control of Induction Motor Using Fuzzy Logic Controller Applied to Electric Vehicle</b>	366
<i>Abderrahmane Ouchatti, Ahmed Abbou, Mohammed Akherraz, Abderrahim Taouni</i>	
<b>Annular condensation flow in horizontal rectangular microchannels: impact of the variable heat flux imposed on the outer wall on energy efficiency</b>	373
<i>Hicham EL MGHARI, Hasna LOUHLIA</i>	
<b>Comparative Study of Thermal Behaviour of Two Types of Apartments Located in Casablanca</b>	380
<i>K. JRAIDA, A. FARCHI, B. MOUNIR, I. MOUNIR</i>	
<b>Comparison of two compensation control strategies for shunt Active Power Filter</b>	384
<i>Faiza KADDARI, Benyounes MAZARI, Youcef MIHOUB, Ahmed SAFA</i>	
<b>Experimental study of heat storage in a PCM incorporated into a residential premises walls</b>	390
<i>Yassine BOUZLOU, Amina MOURID, Mustapha EL ALAMI, Mostafa NAJAM, Mustapha FARAJI</i>	
<b>Resolution of Economic Dispatch Problem considering Wind Power Penetration Planning</b>	395
<i>Ahmed Salhi, Djemai Naimi, Tarek Bouktir</i>	
<b>Numerical evaluation of heat transfer in corrugated heat exchangers</b>	401
<i>Aicha Chorak, Ernest Ihringer, Abdellatif Ben abdella, El Hachmi Essadiqi, Mohsine Bouya, Mustapha Faqir, Said Dhimdi</i>	
<b>Fractal Multiband Planar Antenna for Wireless Power Transmission</b>	407
<i>BENYETHO Taoufik, ZBITOU Jamal, EL ABDELLAOUI Larbi, BENNIS Hamid, TAJMOUATI Abdelali, TRIBAK Abdelwahed, LATRACH Mohamed</i>	
<b>An Advanced PID-PSS Based Genetic Algorithms Implemented using GUI - MATLAB</b>	411
<i>GHOURAF Djamel Eddine , NACERI Abdellatif</i>	
<b>Effects of Three Passive Techniques on Thermal Performance of a Building in Marrakech Region</b>	419
<i>Hicham MASTOURI, Brahim BENHAMOU, Hassan HAMDI, Karim LIMAM</i>	
<b>Effect of thermal insulation and ground coupling on thermal load of a modern house in Marrakech</b>	425
<i>Issam SOBHY, Abderahim BRAKEZ, Brahim BENHAMOU</i>	
<b>On Numerical Modeling in OWC Systems for Wave Energy Conversion</b>	431
<i>H. BOUHRIM, A. EL MARJANI</i>	
<b>Reducing Electric Energy Interruptions to Residential Sector By Means of Proper Practical Measures</b>	436
<i>Abdullah M. Shaalan</i>	
<b>Heat transfer from horizontal cylinder with fins embedded in PCM</b>	442

<i>Kousksou Tarik, Mahdaoui Mustapha, Hlimi Mohamed, Jamil Abdelmajid, El Rhafiki Tarik</i>	
<b>A new hybrid control method for multi-cell choppers. Application to power renewable energy systems</b>	447
<i>Bilal Amghar, Ikram El Abbassi, M. A. M. Mladjao, Abdelmoumen Darcherif</i>	
<b>A three-dimernsional numerical simulation of heat exchanges between the ground and shallow basements in Marackech</b>	453
<i>Naima Sakami, Lahcen Boukhattem, Hassan Hamdi</i>	
<b>Rare earths and metal nanoparticles in silicate glass-ceramics to improve the efficiency of photovoltaic solar cells</b>	457
<i>A. Bouajaj, S. Belmokhtar, M. Britel, S. Normani, C. Armellini, F. Enrichi, M. Ferrari, B. Boulard, F. Enrichi, F. Belluomo, A. Di Stefano</i>	
<b>A Robust Phase-Locked-Loop Approach for the Generation System with Power Flow Control</b>	463
<i>Aziza Benaboud, Alfred Rufer</i>	
<b>Genetic Algorithm for Solving Large Practical Fuzzy Economic Load Dispatch with Prohibited Operating Zones</b>	469
<i>Abdellah DERGHAL, Noureddine GOLEA</i>	
<b>A New Technique of Backstepping Control Parameters Determination Using Genetic Algorithm</b>	475
<i>Mohamed MOUTCHOU, Hassan MAHMOUDI, Ahmed ABOU</i>	
<b>Maximum Loading Point in Distribution System with Renewable Resources Penetration</b>	481
<i>Khaled Ras Guerriche, Tarek Bouktir</i>	
<b>Improvement performance of sensorless direct field oriented control induction motor drive with fuzzy logic controllers</b>	487
<i>Abderrahim Bennassar, Ahmed Abbou, Mohamed Akherraz, Mohamed Barara, Adil Essalmi, Yassine Zahraoui</i>	
<b>Dynamic Simulation of Single Phase Transverse Flux Linear Motor</b>	493
<i>Rashed Meer, Hany Mohamed Hasanien, Abdulrahman Ibrahim Alolah</i>	
<b>Passive Filter for Harmonics Mitigation In Standalone PV System for non Linear Load</b>	499
<i>Mouna TALI, Abdellatif OBBADI, Abdelkrim ELFAJRI, Youssef ERRAMI</i>	
<b>Thermal behavior of PCM building material under periodic convection boundary conditions</b>	505
<i>Arid Ahmed, Kousksou Tarik, Zeraouli Youssef, Allouhi Amine, El Rhafiki Tarik</i>	
<b>Thermal model of IGBT Modules in the arm converter</b>	511
<i>Ahmed HADDOU, Fadwa HARAKA, Hafsa EL OMARI, Hamid EL OMARI</i>	
<b>A new kinetic approach to analyze the thermally stimulated photodegradation of solar devices</b>	515
<i>Muhammad Azeem Arshad, Abdelkarim MAAROUI</i>	
<b>Energy Saving in Tunnels Lighting using Shading Structures</b>	519
<i>Ahmed O. Abdul Salam, Kahtan A. Mezher</i>	
<b>An Advanced Novel Solvent for CO<sub>2</sub> Post-Combustion Capture Application</b>	525
<i>Ahmed Sodiq, Abdurahim Abdulkadir, Adewale Adeosun, Mohammad R. M. Abu-Zahra</i>	
<b>Synthesis of titania with different shapes</b>	531
<i>Hadi Nur, Sheela Chandren, Lai Sin Yuan</i>	
<b>Study on Co-Gasification of Oil Palm Fronds and Wood</b>	536
<i>Shaharin Anwar Sulaiman, Samson Mekbib Atnaw, Abdul Rahman Japar</i>	
<b>Compilation of Factors Affecting Durability of Proton Exchange Membrane Fuel Cell (PEMFC)</b>	542
<i>Mohammed JOURDANI, Hamid MOUNIR, Abdellatif EL MARJANI</i>	
<b>A Global Maximum Power Point Tracking Algorithm for Photo-Voltaic Array with Non-uniform Insolation</b>	548
<i>Abdelkader Bousselham, Zhaojun Cen, Ali Y. Elrayyah</i>	
<b>Basic Parameter Extraction From An Organic Solar Cell Through The Single Diode Model And A Metaheuristic Technique With The Lambert W Function</b>	554

<i>Nedim Tutkun, Erdem Elibol, Dincer Maden</i>	
<b>Optimal Power Flow for a Hybrid AC/DC Microgrid</b>	559
<i>Nabil QACHCHACHI, Hassane MAHMOUDI, Abdennabi EL HASNAOUI</i>	
<b>A Greedy Method for Optimizing the Self-Adequacy of Microgrids Presented as Partitioning of Graphs with Supply and Demand</b>	565
<i>Raka Jovanovic, Abdelkader Bousselham</i>	
<b>Integration of Renewable Energy in Demand-Side Management for Home Appliances</b>	571
<i>Manar Jaradat, Moath Jarrah, Yaser Jararweh, Mahmoud Al-Ayyoub, Abdelkader Bousselham</i>	
<b>Efficient Rectenna Design Incorporating New Circularly Polarized Antenna Array for Wireless Power Transmission at 2.45GHz</b>	577
<i>Mohamed Adel SENNOUNI, Jamal ZBITOU, Benaissa ABOUD, Abdelwahed TRIBAK, Mohamed LATRACH</i>	
<b>Improved Circularly Polarized Rectenna Design for Microwave Power Transmission at 2.45GHz</b>	582
<i>Mohamed Adel SENNOUNI, Jamal ZBITOU, Benaissa ABOUD, Abdelwahed TRIBAK, Mohamed LATRACH</i>	
<b>Wireless Sensor Network Applications in Smart Grid</b>	587
<i>Mohamed El Brak, Said El Brak, Mohamed Essaïdi, Driss Benhaddou</i>	
<b>Spectroscopic Analysis of Polyfuran and Theoretical Investigation of Electronic Properties of Oligofurans Destined for the solar cell applications</b>	593
<i>Ouafae Ninis, Mustapha Abarkan, Mohammed Bouachrine</i>	
<b>Optical Properties of Ni doped 3C-SiC with ab initio calculations</b>	596
<i>M. Houmad, A. Abbassi, A. El Kenz, H. Ez-Zahraouy, A. Benyoussef</i>	
<b>Band Gap Engineering of (InGaN) for Photovoltaic Application</b>	602
<i>E. Salmani, A. Marjaoui, O. Mounkachi, M. Ben Ali, H. El Moussaoui, H. Ez-Zahraouy, M. Hamedoun, M. Benaissa, A. Benyoussef</i>	
<b>Accurate band gaps for earth-abundant photovoltaic absorber from density functional theory</b>	608
<i>O. Mounkachi, E. Salmani, K. El Maalama, H. Ez-Zahraouy, M. Hamedoun, M. Benaissa, A. Benyoussef</i>	
<b>Electronic structure, Optical and Magnetic properties of <math>Zn_{1-x}M_xTe</math> (<math>M = Ti, Cr</math> and <math>Mn</math>) - Ab initio calculations</b>	611
<i>Halima Zaari, Mourad Boujnah, A.G. El Hachimi, Abdelilah Benyoussef, Abd Allah El Kenz</i>	
<b>Two Anode Materials for Li ion Batteries with different reaction mechanisms : silicon nanowires and ruthenium nitride thin film</b>	615
<i>Barbara Laïk, Jean-Pierre Pereira-Ramos, Aurélien Gohier, Jean-François Pierson, Lucie Leveau, Costel Sorin Cojocaru</i>	
<b>Fuzzy Multi-agent Approach for Diagnosis - Application to electrical energy storage systems</b>	619
<i>Rachid El Amrani, Hamid Tairi, Ali Yahyaoui</i>	
<b>Effect of synthesis conditions and composition modification on the structural and electrochemical properties of layered transition metal oxide cathode materials</b>	626
<i>Wassima El Mofid, Svetlozar Ivanov, Andreas Bund</i>	
<b>Electrochemical Lithium and sodium insertion from aqueous solutions into <math>TiO_2</math> films deposited on stainless steel</b>	631
<i>Fouzia Cherkaoui El Moursli, Zineb Edfouf, Faiza Hajji, Khadija Nabih, Khalid Nouneh, Mohammed Abdelfdil</i>	
<b>SOC estimation of Lithium-ion battery using Kalman filter and Luenberger observer: A comparative study</b>	636
<i>Mouhssine Lagraoui, Said Doubabi, Ahmed Rachid</i>	
<b>Study of electrochemical alkali insertion into carbonaceous materials</b>	642
<i>Tatsuya Hasegawa, Mouad Dahbi, Kei Kubota, Koji Miyamoto, Takeshi Nakano, Kiyofumi Yamagiwa, Shinichi Komaba, Tarik Chafik</i>	

<b>P2-type <math>\text{Na}_x[\text{Fe},\text{Ni},\text{Mn}]\text{O}_2</math> for high capacity Na-ion batteries</b>	647
<i>Kazuki Hashimoto, Kei Kubota, Issei Ikeuchi, Ismael Saadoune, Shinichi Komaba</i>	
<b>Rechargeable Na-ion batteries for large format applications</b>	651
<i>Shinichi Komaba, Kei Kubota, Mouad Dahbi, Kazuyasu Tokiwa</i>	
<b>Nuclear probes for battery materials investigations Mössbauer spectroscopy, nuclear scattering, and neutron scattering</b>	655
<i>Raphaël P. Hermann, Abdelfattah Mahmoud, Magali Brisbois, Frédéric Boschini</i>	
<b>Intelligent Control MPPT Technique for PV Module at Varying Atmospheric Conditions Using MATLAB/SIMULINK</b>	661
<i>L. Zaghiba, A. Borni, N. Terki, A. Bouchakour</i>	
<b><math>\beta\text{-In}_2\text{S}_3</math> Thin Film Doped by Tin (<math>\text{Sn}^{4+}</math>) and Deposited by Chemical Spray Pyrolysis Technique for photovoltaic applications</b>	667
<i>Thierno Sall, Bernabe Mari Soucase, Miguel Mollar, Bouchaib Hartiti, Mounir Fahoume</i>	
<b>Potentialities of using Linear Fresnel technology for solar energy development in Djibouti</b>	672
<i>A. Abdourazak, S. Abderafi, D. Zejli, I. Abdoulkader</i>	
<b>Improving the functioning of a transformer less inverter equipping a photovoltaic generator</b>	676
<i>M. Jbilou, I.S. Bousmaha, Z. Dey, M. Brahami</i>	
<b>Study of the properties of <math>\text{TiO}_2</math> thin films for photovoltaic application</b>	682
<i>Z. ESSALHI, B. HARTITI, A. LFAKIR, M. SIADAT, P. THEVENIN</i>	
<b>A numerical simulation study of ZnTe-based solar cells</b>	686
<i>Hanif Ullah, Bernabe Mari Soucase, O. Skhouni, A. El Manouni</i>	
<b>Selective Emitter Structure for Multicrystalline Silicon Solar Cells</b>	691
<i>A. Djelloul, A. Moussi, K. Bendimrad, S. Meziani, M. Mebarki, L. Mahiou, K. Bourai, A. Noukaz</i>	
<b>Effect of substrate on <math>\text{ZnO}</math> thin films grown by SILAR method</b>	695
<i>Abderrahim Raidou, Mohamed Lharch, Khalid Nouneh, Mohammed Aggour, Ahmed Qachaou, Larbi Laanab, Mounir Fahoume</i>	
<b>Numerical simulation of the performance of dual junction a-Si:H/a-SiGe:H solar cell with AMPS-1D</b>	701
<i>Youssef El Hassouani, Kaouthar Hafid Alaoui, Abdellah El Idrissi, Mohamed El Hahioui, Abdellah Benami</i>	
<b>Determination of the optimal conditions for the deposition of <math>\text{Cu}_2\text{ZnSnS}_4</math> (CZTS) thin films by Spray Pyrolysis using Taguchi method</b>	705
<i>Youssef Arba, Joël Hervé Nkuissi Tchognia, Bouchaib Hartiti, Abderraouf Ridah, Philippe Thevenin</i>	
<b>Simulation of hydrophobic surfaces: A case study of <math>\text{ZnO}</math> thin film</b>	711
<i>Hajar Ghannam, Zakaria Oulad El hmaidi, Zineb Yamlahi Alami, Mohamed Addou, Adil Chahboun, Moez Salem, Mounir Gaidi</i>	
<b>Mapping of solar water heating systems technologies in Morocco</b>	716
<i>Mohsine Bouya, Merieme Agdid, Abdellatif Ben Abdellah</i>	
<b>Optimization of thermal performance of building integrated solar collector with Phase Change Material</b>	720
<i>Z. BOUHSSINE, M. FARAJI, M. NAJAM, M. EL ALAMI</i>	
<b>Comparative Study of Fin Geometries for Heat Sinks in Natural Convection</b>	723
<i>Abdelhadi BOUKNADEL, Imane RAH, Hafsa EL OMARI, Hamid EL OMARI</i>	
<b>Comparative study based on thermal efficiency of solar air heaters</b>	729
<i>Hicham El Ferouali, Said Doubabi, Naji Abdenouri</i>	
<b>Numerical study of solar latent heat storage unit using Paraffin Wax P116</b>	735
<i>R. Elbahjaoui, H. El Qarnia</i>	
<b>Solar absorption air-conditioning systems: An energy and economy approach</b>	741
<i>A. ALLOUHI, A. JAMIL, Y. MOURAD, T. KOUSKSOU</i>	
<b>Application of feedback-feedforward loop digital control to a PWM dc-dc boost converter</b>	747

<b>used for solar photovoltaic systems</b>	
<i>Jaouad Tanouti, Mohammed Setti, Abdelhak Aziz, El Mamoun Aziz</i>	
<b>Advanced Control of Three-Phase Grid Connected PV Generator</b>	753
<i>A. Yahya, H. El Fadil, F. Giri, H. Erguig</i>	
<b>Optimizing of The Silicon Solar Cell's Performance Using The Simulator PC-1D</b>	759
<i>Said Assal, Said Yadir, Houssam Amiry, Mouncif Sidki, Mohammadi Benhmida</i>	
<b>Fuzzy logic PI controller for PV water pumping system</b>	764
<i>Sabah MIQOI, Abdelghani El Ougli, Belkasem Tidhaf, Boutouba Mohamed</i>	
<b>Modeling and Simulation of a Linear Fresnel solar collector</b>	770
<i>Soukaina El Alj, Ahmed Al Mers, Noureddine Boutammachte, Abdelfattah Bouatem, Ossama Merroun</i>	
<b>"Propre.Ma" project: roadmap &amp; preliminary results for grid-connected PV yields maps in Morocco</b>	774
<i>N. Aarich, N. Erraïssi, M. Akhsassi, A. Lhannaoui, M. Raoufi, A. Bennouna</i>	
<b>Study of the solar combisystems for different types of building construction in Algiers climate</b>	778
<i>S. Bahria, A. Hamidat, A. Khoudja, M. Amirat, M. El Ganaoui</i>	
<b>Development and Integration of Innovative Low-Cost PV Windows Based on Dye Sensitized Solar Cells Technology: Application in Morocco</b>	782
<i>Ayoub El baraka, Mimouna Baitoul, Asmae Khaldoun, Houda Ennaceri</i>	
<b>Comparison of Synthesis Routes of Inorganic Fullerene-like Nano-additives for Wind Turbine Lubrication: Application of Life Cycle Assessment Approach</b>	788
<i>Hanane Akram, Ouafae Achak, Soukaina Haffane, Chaouki Elmoujahid, Abdelilah Elmesbahi, Driss Elmessoudi, Tarik Chafik, SalahEddine Bensemblali, Abderrahim Elmouakibi</i>	
<b>Robust Adaptive Backstepping control approach of DFIG Generators for Wind Turbines Variable-Speed</b>	791
<i>Badre Bossoufi, Hala Alami Aroussi, El Mostapha Ziani, Mohammed Karim, Ahmed Lagrioui, Aziz Derouich, Mohammed Taoussi</i>	
<b>Modeling and Simulation of Wind Energy Chain Conversion</b>	798
<i>Samir BELLARBI, N. KASBADJI MERZOUK, A. MALEK</i>	
<b>Experimental modeling and control of a small wind PMSG turbine</b>	802
<i>Lahfaoui Badreddine, Smail Zouggar, Mohammed Larbi Elhafyani, Fatima Zahra Kadda</i>	
<b>Wind Farm Reliability Optimization using Harmony Search under Performance and Budget Constraints</b>	808
<i>R. Meziane, E. Châtelet, Y. Bouzidi, S. Boufala, A. Hamzi, M. Amara</i>	
<b>The New Architecture of a BUCK-BOOST Shunt Converter Non-inverter Dedicated to the Wind Turbine System with A High efficiency</b>	816
<i>Mohammed Seddik, Smail Zouggar, Bader Lahfaoui, Mohammed Elhafyani, Abdelhak Aziz</i>	
<b>Sliding Mode Control of wind turbine emulator</b>	822
<i>Souhila Zine, Benyounes Mazari, Mohamed Amine Bouzid, Youcef Mihoub</i>	
<b>Modeling of flow around a wind rotor HAWT - Application to the dynamic stall</b>	827
<i>Ali NOUIOUA, Rabah DIZENE</i>	
<b>Artificial Intelligence control applied in wind energy conversion system</b>	831
<i>F. Arama, B. Mazari, A. Dahbi, K. Roummani, M. Hamouda</i>	
<b>Modeling of hybrid system combining an offshore wind turbine and an Oscillating Water Column system</b>	836
<i>Mustapha MALHOUNI, El Mostapha BOUDI</i>	
<b>The Voltage Regulation of the Asynchronous Wind Turbine Using a SVC</b>	840
<i>Hassan Zahboune, Smail Zouggar, Mostafa Ziani, Sanae Dahbi, Mohammed Elhafyani</i>	
<b>Improvement of the Availability of the DFIG Wind Turbines during Voltage DIP with Crowbar Circuit</b>	846
<i>DRHORHI Ismail, LAHDA Mohamed, MIMET Abdelaziz</i>	
<b>Passive study of thermal inertia and thermal behavior of two locals 'test' with and without</b>	851

<b>PCM located in Casablanca city</b>	
<i>Amina MOURID, Yassine BOUZLOU, Mustapha EL ALAMI, Mostafa NAJAM, Mustapha FARAJI</i>	
<b>Modeling of the internal loads of a building and analyzing their impact on the thermal behavior and electricity consumption</b>	855
<i>GUEDDOUCH Touria, SAAD Abdellah, HMIDAT Abdehamid</i>	
<b>State feedback controller for current source inverter Based STATCOM used for unbalance compensation in high voltage power grid</b>	861
<i>Anas Benslimane, Jamal Bouchnaif, Mohamed Azizi, Khalid Grari</i>	
<b>Comparative Study between Several Strategies Speed Controllers in an Indirect Field-Oriented Control of an Induction Machine</b>	866
<i>Chaymae LAOUI, Ahmed ABOU, Mohammed AKHERRAZ</i>	
<b>Induction Machine Identification Based on a New Technique of Simulated Annealing Optimization</b>	873
<i>Mohamed MOUTCHOU, Hassan MAHMOUDI, Ahmed ABOU</i>	
<b>DTC of PMSM based on artificial neural networks with regulation speed using the fuzzy logic controller</b>	879
<i>Adil Essalmi, Hassan Mahmoudi, Ahmed Abou, Abderrahim Bennassar, Yassine Zahraoui</i>	
<b>POWER SYSTEM STABILIZER DISIGN USING H <math>\infty</math> ROBUST TECHNIQUE TO ENHANCE ROBUSTNESS OF POWER SYSTEM</b>	884
<i>HORCH Abdessamad, NACERI Abdellatif, AYAD AHMED</i>	
<b>Optimization of 33/225 KV Power Evacuation Transformers in Onshore Wind Farms in Morocco</b>	890
<i>Noredine Citroen, Ouassaid Mohammed, Maaroufi Mohamed</i>	
<b>Sensorless Control of the Switched Reluctance Motor</b>	895
<i>Khalid Grari, Jamal Bouchnaife, Mohammed Azizi, Anas Benslimane</i>	
<b>Operation Optimization and Economic Assessment of Energy Storage</b>	901
<i>Khalid Loudiyi, Asmae Berrada</i>	
<b>Effect of internal currents, fuel crossover, and membrane thickness on a PEMFC performance</b>	907
<i>Adil Atifi, Hamid Mounir, Abdellatif El marjani</i>	
<b>Different Harvesting of Marine Microalgae</b>	913
<i>Ángeles Cancela, Ángel Sánchez, Rocío Maceiras, Víctor Alfonsín</i>	
<b>The influence of temperature on the production of biogas under mesophilic regime</b>	917
<i>Amine HAJJI, Mohammed RHACHI</i>	
<b>Lipids extraction from microalgae for biodiesel production</b>	921
<i>Ángel Sánchez, Ángeles Cancela, Rocío Maceiras, Víctor Alfonsín</i>	
<b>Proposed Vision of Algerian Smart Grid</b>	925
<i>Benahmed Khelifa, Khannous Fatiha, Douli Amel</i>	
<b>The investigations of Electronic Structure, Optical and Magnetic Properties of MgB<sub>2</sub> nanosheets</b>	931
<i>Halima Zaari, Sufyan Naji, A.G. El Hachimi, Abdelilah Benyoussef, Abd Allah El Kenz</i>	
<b>Alternative treatment of petroleum waste via thermochemical conversion</b>	935
<i>Isam Janajreh, Thomas Arink, Ahmed Al Shehhi</i>	
<b>Numerical Simulation of Membrane Desalination in a Conjugated Heat Transfer Configuration: Role of Spacers</b>	941
<i>Isam Janajreh, Raed Hashaikeh, Dana Suwan</i>	