ICEREGA 2018
International Conference on Emerging and Renewable Energy: Generation and Automation
(28-30 October 2018 in Sousse, Tunisia)
Book of Abstract

Word of Welcome

GENERAL Chair Dr. Mohamed Becherif

Dear Colleagues,

On behalf the ICEREGA18 organization committee, it is my honor and pleasure to welcome all participants of this International Conference on Emerging and Renewable Energy: Generation and Automation (ICEREGA 2018) 28-30 October 2018 in Sousse, Tunisia. Renewable Energy, production, application, use, transportation, control, materials and environment policy and issues are the major concerns treated in this conference. More than 123 submissions from 23 countries were submitted to our conference. Submissions have been carefully considered to establish a high quality and comprehensive program of presentations.

This event succeeds under the support and encouragement of different institutions and sponsors. I would like to thank: UTBM (France), UFC (France), UFR-STGI (France), and IUT-BM (France).
Prestigious Journals supported ICEREGA18 to publish high quality papers selected from our conference. I would like to thank all Editorial boards of these journals.
I highly encourage each one of you to share and exchange ideas with colleagues, this is wonderful opportunity to meet international experts in a one place.
I would like to express my deepest thanks to all who helped in the organization and success of this wonderful event.
In the name of the whole Conference committee, we highly welcome each one of you. We are delighted to keep working to provide you with the best experience and knowledge exchanges.

Mohamed Becherif,
ICEREGA'18 General Chair

General Co-chair: Dr. Haitham Ramadan

Dear ICEREGA18 Friends,

As ICEREGA'18 General Co-Chair and on behalf of the Organizing Committee team, We are happy to welcome you in Sousse-Tunisia, to the International Conference on Emerging and Renewable Energy: Generation and Automation (ICEREGA'18). This is the first time to be held in the Green Tunisia. ICEREGA'18 itself has grown tremendously in favour of the gradual paper submission rate in addition to the rigorous paper selection (acceptance rate less than 63%). Therefore, more high-quality scientific papers are accepted in this truly international event.

We are so glad welcoming you here with us in Sousse for what promises to be our best and most memorable event yet. We have packed all three days with technical speeches, exciting oral and poster presentations, thought-provoking panels, and the chance to meet amazing people from more than 18 countries all over the world to discuss the advanced researches in Renewable Energy generation, applications and materials to environmentally protect our planet particularly from climate change problems.

Most of us have converged in Sousse-Tunisia, with different backgrounds and experiences. But we almost certainly agree on the role of Renewable Energy in the next era.

Let's move together, learn, make new friends and meet new partners. Let's dive into the sessions and soak up the speeches, but we should not forget to save a little energy for the social event besides the Gala party.

Get ready to inspire and be inspired. Better scientific research and stronger cooperation may start in ICEREGA18.

Haitham S. Ramadan,
ICEREGA'18 General Co-Chair

General Co-chair: Prof. Mohamed T. Benchouia

On behalf of the University of Mohamed Kheider (Biskra, Algeria) and the LGEB Laboratory, I'm pleased to welcome all delegates and visitors to this new edition of the ICEREGA – International Conference on Emerging and Renewable Energy: Generation and Automation, here, in this beautiful city of Sousse, Tunisia.

The ICEREGA Conference is growing from year to year, to becoming now one of the most prestigious biennial conference in the field of renewable energy applications.

I've been hugely impressed by the diversity and high standard of submissions we received for this year's ICEREGA. I hope that the scientific program will be both stimulating and informative. Of course, in seeking to promote new interactions between researchers, I also hope that our social program will live up your expectations and that you will gather fond memories of ICEREGA'2018.

I want also to thank all the members of the organization committee, all the colleagues for their strong support and for having carried a huge and complicated workload. I wish also to acknowledge all members of the International Program Committee, who had the arduous task of reviewing the very many submissions we received.

So, now, enjoy your stay at ICEREGA'2018 and enjoy your in stay in Sousse, Tunisia!

Prof. Dr. Mohamed T. Benchouia
ICEREGA'2018 Co-Chair

ICEREGA 2018

Biofuel production from agricultural waste biomass available in arid areas

Presented by: Dr. Ala'a H. Al-Muhtaseb

Associate Professor of Chemical Engineering
Department of Petroleum and Chemical Engineering
College of Engineering
Sultan Qaboos University

Date	*Time*	*Location*	
28h October 2018	*9:00-10:00*	*ICEREGA*	*Amphi*

Biography

Dr. Ala'a H. Al-Muhtaseb is an Associate Professor in the Department of Petroleum and Chemical Engineering at Sultan Qaboos University. He obtained his BSc in Chemical Engineering from Jordan University in 1999, and PhD in Chemical Engineering from Queen's University Belfast (UK) in 2004. Currently, the overarching aim of his research is on catalysis and its applications in biofuels and wastewater treatment. He has over 80 publications in several peer reviewed Journals, 15 international conference, and 2 book chapters. Dr. Ala'a has a number of major research projects and consultancy services during the last 10 years with a total value of around US $ 2 million in different areas of energy and water treatment.

Lectures Details

The decreasing availability of fossil fuels and environmental issues associated with their use has placed a greater emphasis on biofuels production as a potential source for energy production in the current era. Production of biofuels from plant-based oil has a good prospect as a potential alternative to fossil fuels. The concept of utilizing waste date pits for biofuels production is promising due to its abundant availability in Oman. In this study, an efficient utilization of waste date pits biomass for synthesizing green carbon catalyst to be used for the production of biodiesel was investigated. The green carbon catalyst was modified by KOH and characterized by XRD, SEM, EDX, TEM and BET. Response surface methodology (RSM) was used to study the effect of process parameters such as reaction temperature, time, catalysts type and methanol to oil ratio on the yield of the produced biodiesel. The optimized yield obtained within 1 h was 91.6% at 65°C, with catalysts type C3 (6 wt% KOH on carbon) and a 9:1 methanol to oil ratio. The biodiesel was characterized in order to verify its quality compared with the international standards. The biodiesel possessed a cetane number of 60.31, density of 881 kg/m3, viscosity 4.24 mm2/s, cloud point 3.9°C, cold filter plugging point -0.62°C, pour point -1.4°C and flash point 141°C which lies within the limits specified by the international standards of ASTM and EN. Waste date pits can be used for the production of green carbon catalysts as well as for biodiesel production.

ICEREGA'18: SS01
Progress in Energy Recovery and Energy Management

Chairmen:
Dr. Mohamad Ramadan, International University of Beirut (Lebanon)
Dr. Bashira Yousef, College of Engineering, University of Sharjah (UAE)

Date	Time	Location
28/10/2018	10:30-12:30	Room A

Paper ID : 210-SS01

Title: NUMERICAL INVESTIGATION OF NATURAL CONVECTION IN A HORIZONTAL CYLINDER WITH A RADIALLY PARTIAL HEATING

Authors: A. Mazgar, K. Jarray, F. Hajji, F. Ben Nejma
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The Preparatory Institute for Engineering Studies of Monastir, University of Monastir, Tunisia - Rue Ibn El Jazzar, 5000 Monastir, Tunisia

Abstract: The current study reports a numerical analysis of natural convection heat transfer phenomenon of air in a horizontal cylinder with an angular partial heating at wall. Three relative positions of the active zones are discussed. The first heating section is located across one-quarter of the circular wall, the second is located across one-half of the cylindrical surface and the third is made of three-quarters of the cylinder. The effects of Rayleigh number on heat transfer and the structure of fluid flow within the cavity are examined. Special attention is given to the influence of heating location on the energy efficiency of the system. The results show that the optimum heater size and location are generally but not necessarily obtained when three-quarters of the cylinder are radially heated.

Paper ID : 234-SS01

Title: EXPERIMENTAL STUDY OF THE COMBINED RES-BASED GENERATORS AND ELECTRIC STORAGE SYSTEMS FOR PUBLIC BUILDINGS

Authors: K. Sahlaoui, A. Ben Mabrouk, H. Oueslati, S. Ben Mabrouk, D. La Cascia, G. Zizzo, S. Favuzza, F. Massaro, L. Dusonchet
Corresponding Author Email: salah.benmabrouk@crten.rnrt.tn
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DEIM – Department of Energy, Engineering Information and Mathematical models University of Palermo; Palermo, Italy.

Abstract: In the present paper, a new approach to the management of energy resources in a research laboratory is proposed and evaluated by a simulation for the PV installation realized for the Tunisian Italian cooperation project DE.DU. ENER.T, using renewable energy and economic criteria.
The aim of this project is to improve energy efficiency order to minimize the electricity cost consumed at the laboratory LPT. According to the bills of electricity received we noticed that there is a high consumption of electrical current, from the STEG grid. So, we targeted to install a photovoltaic field of 12KWc to reduce these bills by using the sustainable, green and clean sources.
In addition, a theoretical study of the PV system sizing realized manually in order to know in the first hand the compatibility between the different equipment of this installation and to compare the results with those found by the SMA Sunny Design and PV*SOL software in the second hand.

Paper ID : 269-SS01

Title: NUMERICAL AND EXPERIMENTAL ANALYSIS OF A COILED HEAT EXCHANGER

Authors: Rabih Murr, Mahmoud Khaled, Ali Shaito, Farouk Hachem and Mohamad Ramadan
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International University of Beirut (BIU)
Univ Paris Diderot, Sorbonne Paris Cité, Interdisciplinary Energy Research Institute (PIERI), Paris, France
Associate member at FCLAB, CNRS, Univ. Bourgogne Franche-Comte, Belfort cedex, France

Abstract: Heat recovery is one of the most efficient solutions to overcome the energy crisis. Indeed, it is considered an indirect source of energy that permits to reduce fuel consumption. On one hand, it allows to reduce waste energy and on the other hand it decreases the pollution foot print of engineering systems. Nevertheless, heat recovery can be applied within different configurations depending on the nature of the available energy. That is why, behind the

scene a heat recovery simulator is needed allowing to optimally size the heat recovery system. In this frame, the present paper suggests a numerical tool to simulate coiled heat exchanger. The modeling of the heat recovery system is presented. Furthermore, the software is validated experimentally to show its accuracy. Moreover, a case study is considered to project the performance of the developed software. Results show the flexibility of the software as well as its performance.

Paper ID : 189

Title: Comprehensive Review on Electric Vehicle Charging System Powered by Solar

Authors: F. Eltoumi , M. Becherif , H. S. Ramadan , A. Djerdir
Corresponding Author Email:
Affiliation: Department of Energy, FCLab, FR CNRS 3539, Femto-ST, UMR CNRS 6174, Bourgogne Franche-Comte University/ UTBM, Belfort Cedex, France
Zagazig University, Faculty of Engineering, 44519 Zagazig, Egypt

Abstract: Recently, the use of Electric vehicles (EVs) has increased considerably in numerous countries. These means of transport are less energy consuming and more environmental friendly compared to conventional vehicle. However, their extensive adoption worldwide is restricted due to the lack of charging stations. Thus, many efforts have been made to install EV charging stations. In fact, when EVs are charged by the accessible utility grid powered through the application of fossil fuel-based generation system, the distribution system will be affected and cannot be considered as Solar PV system. Because solar energy plays important role in producing the electricity from PV panel, the EVs charging from such type of panel can be a good alternative and sustainable step to maintain the safety of the environment. This paper is a complete survey of solar PV-EV charging systems as well as their application in the world. Indeed, analytical techniques were introduced to get data about EV charging behavior, the operating modes of the charging station and the geolocation of charging station users. The developed methodology was less time- and cost-consuming.

Paper ID : 190-SS01

Title: PATHWAYS TO PLUS ENERGY BUILDINGS IN ALGERIA: DESIGN OPTIMIZATION METHODOLOGY BASED ON GIS AND MULTI-CRITERIA DECISION ANALYSIS

Authors: Charafeddine MOKHTARA, Belkhir NEGROU, Noureddine SETTOU
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Abstract: Building is the first energy consumer sector, and it is responsible of high fraction of greenhouse gas emissions locally and worldwide. In this context, achieving plus energy buildings can provide key solution to these challenges nowadays. This paper presents an alternative methodology for design of plus energy buildings in Algeria. In this paper, the best selection and ranking of renewable energy and energy efficiency alternatives is carried out using a multi-criteria decision-making approach based on Analytic Hierarchy Process. Hence, ArcGIS software is used for analyze output data of TRNSYS, Matlab and TSOL software. Other, ArcGIS is used to develop our maps. Many scenarios are investigated to achieve our goals. Besides, a typical residential building is selected to apply our methodology. The results ranking solar energy first, then wind energy. In other hand, adding insulation layers to building envelop is the first alternative to improve building efficiency, followed by using efficient lighting system and appliances. The results emphasize the efficiency of our methodology to design plus energy buildings by selecting the best available choices. Finally, this methodology will contribute on sustainability and energy saving.

Paper ID : 186

Title: A REVIEW STUDY ON THE MODELING OF LOW TEMPERATURE SOLAR THERMAL COLLECTOR SYSTEM

Authors: Bashria A. A. Yousef, Ahmed A. Hachicha, Muhammad Abid
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Affiliation: 1University of Sharjah, College of Engineering, Sustainable and Renewable Energy Engineering Department, Sharjah, P. O. Box 5 27272, UAE.
2Mechanical and Energy Engineering Department, College of Engineering, Imam Abdulrahman Bin Faisal University, Dammam 31441, Saudi Arabia

Abstract: Several parameters must be studied and analyzed during design and evaluation of solar system. Studying those parameters experimentally are costly and time consuming. Therefore, many modeling techniques has been raised- up to predict the performance of solar systems in the early stage of design. A review of different modeling approaches including steady and dynamic models for low temperature solar collectors (LTSC's) are presented in this paper. Steady state considered simple and an easy computational model, suitable to predict the thermal performance at a reasonable time and useful for preliminary design. However, outdoor validation is time consuming and needs strict condition. On the other hand, dynamic model is more complex and its complicity increased for multi-node

model, but outdoor validation can be performed in short time with reasonable condition. CFD, f-chart and simulation using TRNSYS as a tool for thermal design assessment are presented. Finally, Comparisons, different features and capability of the aforementioned approaches are reported in this paper.

Paper ID : 157_V (Distance Presentation Paper)

Title: Model Predictive Control Based Air Management of a PEM Fuel Cell System

Authors: A. Accetta, M. Cirrincione, A. Mohammadi, M. Pucci, K. Ram
Corresponding Author Email: accetta@pa.issia.cnr.it
Affiliation: Institute of Intelligent System for the Automation (ISSIA), Italian National Research Council (CNR)
University of the South Pacific, Suva, Fiji

Abstract: This paper presents a Model Predictive Control (MPC) for the air management system of a Proton Exchange Membrane (PEM) Fuel Cell System (FCS) to regulate the oxygen excess ratio for variable load conditions. The MPC acts only on the compressor motor speed reference. No static feedforward control has been used. The MPC has been devised by using the linearized model of the FCS to control the nonlinear system. The MPC has been also compared with a feedforward control scheme. The results show that the MPC is able to regulate the air management system in spite of rapid load conditions, with a quick recover of the oxygen excess ratio thus avoiding the oxygen starvation of the FC stack. Finally the MPC has been able to satisfy the constraints of the compressor for all the working conditions.

ICEREGA'18: Poster Session 1

Chairmen:
Prof. Mohamed T. Benchouia, University of Mohamed Kheider (Algeria)
Dr. Mohamad Ramadan, International University of Beirut (Lebanon)

Date	Time	Location
28/10/2018	12:30-13:00	Room A

Paper ID : 183-SS01

Title: Study the development (Evolution) of process of hydraulic fracturing « the study of the well-bore ONM 543»

Authors: Mohamed Ali ARBAOUI, Messaoud Hassini
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geologie Département, Kasdi Merbah University, Ouargla. BP 511 Ouargla 30000, Algérie

Abstract: The natural exploitation of an oil deposit, means reducing the hydrocarbons to the surface with favorable conditions, with its natural depletion. When this energy does not meet the constraints of production, and the reserves in place are important, new recovery techniques are introduced to improve the characteristics and the potential of well. Among the techniques commonly used, was the stimulation either by acidification (acid job) or by creating artificial transmissibility (bypass) it's hydraulic fracturing. Hydraulic fracturing is a technique that allows you to create, with an artificial manner a permeable drain by the injection of fluid carrying proppant into the reservoir.
In this work we has tried to define everything that bound with hydraulic fracturing like the damage and the concept of skin as the main constraints exerted on the rock and mechanical and petrophysical properties of some reservoir rocks, the development, implementation, test mini frac and the propagation of different models and we gave a general information for frac fluids, proppants and the application of the method of NOLTE for the analysis pressure declines, Finally we has studied the well ONM 543 and the results confirmed the success of the operation with a gain of flow rates of 7.4 m3 / h, if we take the price of barrel is $ 40 the payback period is 21 days.

Paper ID : 266-SS01

Title: THE EFFECT OF BOOST CONVERTER LOSSES ON ENERGY EFFICIENCY OF PV SYSTEME

Authors: S. Benyahia, M. Becherif, F. Soltani, A. Omeiri
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Affiliation: Department of electrotechnic University Badji Mokhtar, Annaba-Algeria.
FCLAB Research Federation, FR CNRS 3539, FEMTO-ST/Energy Department, UMR CNRS 6174, University of Technology of Belfort-Montbeliard, 90010 Belfort Cedex, France

Abstract: In PV systems structure great challenge of PV designer is to get the maximum power from PV array. That fluctuates depending on solar irradiation, temperature and nature of the loads connected. Thus, a maximum power point tracker is used to extract highest possible power and deliver it to the load during all operating conditions. It consists of DC-DC converter and MPPT controller algorithms. Generally, in the DC – DC boost modeling we neglected the presence of parasitic resistance in storage elements inductor and capacitor for the purpose of simplification. But when neglecting parasitic resistance, it leads to instability and performance degradation. Moreover, it affects the energy yield of overall PV system. The converter efficiency has found about 98% for the insolation level 1000／used in simulation, without taking in to account parasitic resistance. However, adding a parasitic resistance of 1.04 ohm in

the converter model, a fraction of the power managed by the converter has been dissipated and the converter efficiency is decreased to 89 %. In This paper we have to assessing the effect of losses in boost inductor converter on energy yield of PV system.

Paper ID : 272

Title: Detection of the eccentricity in Cage Induction Machine Using Stator Current Signature Analysis

Authors: N. Yassa, M. Rachek, H. Houassine
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University of Mouloud MAMMERI , ALGERIA

Abstract: The classical diagnosis approaches, deeply spread in the industrial environment, are based on the Fourier analysis of the steady-state current, the basis of the proposed methodology consist of analysing the current demanded by the machine during the connection process (startup transient); the objective is to extract the characteristic evolution during the transient of some harmonic components created by the fault; this evolution is caused by the dependence of these components on the slip. In this paper the induction motor under dynamic eccentricity type is modeled with high precision using (CMC) approach.

Paper ID : 193

Title: ELIMINATION OF BROKEN ROTOR BARS FALSE INDICATIONS IN INDUCTION MACHINES

Authors: O. Guellout, A. REZIG, S. TOUATI, A. DJERDIR, A. N'Diaye
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Nuclear Research Centre of Birine, Bp 180, Ain Oussera 17200, Djelfa, Algeria
FEMTO-ST Laboratory, University of Technology Belfot-Montbélliard, 90010 Belfort cedex, France.

Abstract: This work illustrates a method to detect and separate the broken rotor bars from load torque oscillations in motor's line current signature which can be induced from mechanical load condition abnormalities, load fluctuations like speed reduction couplings or a defective transmission. The proposed policy is based on the set of two rotating coordinates (same and inverse angular velocity as the current's fundamental frequency ω) for the stator current vector, and its decomposition into positive and negative components. The extracted components allow to separate similar effects produced by rotor defects and the oscillating load. An experimental test bench has been conducted to validate the simulation results and demonstrate the effectiveness of the proposed approach.

ICEREGA'18: SS05
Wind Power for Renewable Energy Systems

Chairmen:
Dr. Sabrina Abdeddaim, LGEB Laboratory, University of Biskra, Biskra (Algeria)
Dr. Noha Mostafa, Zagazig University (Egypt)

Date	Time	Location
28/10/2018	10:30-12:30	Room B

Paper ID : 201-SS05

Title: EXPERIMENTAL INVESTIGATIONS FOR A STAND-ALONE DOUBLY-FED INDUCTION GENERATOR CONTROL BY USING ROOTED TREE OPTIMIZATION ALGORITHM

Authors: A. Benamor, M. S. Chabani, M. T. Benchouia, K. Srairi, M. Becherif, M.E. H. Benbouzid
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Abstract: This paper deals, a new control strategy for a stand-alone doubly-fed induction generator (DFIG); based on the rooted tree optimization (RTO). The DFIG is generally used in the production of the electric energy the control of this machine at the level of the rotor side converter (RSC) when the control is presented the maintaining voltage and frequency for variable speed DFIG (WECS). A stand-alone DFIG is used to supply electrical energy; the problem of electrical machine control and especially for wind turbines is change of internal parameters of the machine. In this paper, the output signal from the voltage controller by the reference signal.
The experimental investigations are provided in DFIG based on a stand-alone load is performed through by controlling the voltage and frequency. The experimental implementation of the stand-alone machine is a comparison with traditional PI 20 regulator and PI-RTO.

Paper ID : 204-SS05

Title: OPTIMAL TRACKING and HIGH ORDER SLIDING POWER CONTROL of the DFIG WIND TURBINE

Authors: S. Abdeddaim, A. Betka, O. Charrouf
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Affiliation: Electrical engineering Laboratory (LGEB), University of Mohammed Khider Biskra, Algeria

Abstract: In the present paper, an optimal operation of a grid-connected variable speed wind turbine equipped with a Doubly Fed Induction Generator (DFIG) is presented. The proposed cascaded nonlinear controller is designed to perform two main objectives. In the outer loop, a maximum power point tracking (MPPT) algorithm based on fuzzy logic theory is designed to permanently extract the optimal aerodynamic energy, whereas in the inner loop, a second order sliding mode control (2-SM) is applied to achieve smooth regulation of both stator active and reactive powers quantities. The obtained simulation results show a permanent track of the MPP point regardless of the turbine power-speed slope moreover the proposed sliding mode control strategy presents attractive features such as chattering-free, compared to the conventional first order sliding technique (1-SM).

Paper ID : 215-SS05

Title: FINITE-STATE PREDICTIVE CURRENT CONTROL OF A STAND-ALONE DFIG BASED WIND ENERGY CONVERSION SYSTEM

Authors: M.S. Chabani, M.R. Djedidi, R. Boumaaraf, M.T.Benchouia, A.Golea, M. Becherif
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Abstract: This paper proposes a finite-state predictive current control (FS-PCC) for standalone doubly fed induction generators (DFIGs). In the controller, the switching vector selected to be used in the IGBTs minimizes the error between the references and the predicted values. The technique uses a discrete-time model of the system to predict the future values of the rotor currents for all possible voltage vectors generated by the rotor side converter (RSC). In this study, due to computational simplicity, the absolute error is selected as a quality function. In order to investigate the effectiveness of the developed controller, several experimental tests are carried out. The test results show the effectiveness of the proposed anti-windup finite control set model predictive controller when it is compared to the conventional PI controller

Paper ID : 216-SS05

Title: Implementation of the Power Management based on a Fuzzy Logic for a Hybrid PV/Fuel Cell Generation System

Authors: M. TIAR, A. BETKA, M. Sellali , S. DRID
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Abstract: This paper deal with experimental implementation of power management based on a fuzzy logic algorithm for a small-scale renewable hybrid power generation system. To supply an AC load, the system is composed of the photovoltaic module, a fuel cell stack and a grid.
Each source has a local control and the proposed power supervisor permits the smoothly commutation between the different operating modes, to cover permanently the load demand. The experimental results confirm the effectiveness of the proposed technique. This paper deal with experimental implementation of power management based on a fuzzy logic algorithm for a small-scale renewable hybrid power generation system. To supply an AC load, the system is composed of the photovoltaic module, a fuel cell stack and a grid. Each source has a local control and the proposed power supervisor permits the smoothly commutation between the different operating modes, to cover permanently the load demand. The experimental results confirm the effectiveness of the proposed technique.

Paper ID : 222-SS05

Title: NEURAL NETWORK POWER MANAGEMENT FOR HYBRID ELECTRIC ELEVATOR APPLICATION

Authors: M. Maamir, A. Betka, O. Charrouf, M. Sellali, M. Becherif
Corresponding Author Email: m. maamir39 @ gmail.com
Affiliation: 1LGEB Laboratory, Electrical Engineering Department,University of Biskra, Algeria
2Université de Technologie de Belfort-Montbéliard | UTBM · Département Énergie

Abstract: This study presents an energy management system based on artificial neural network for power flow in standalone hybrid power systems of an electric elevator fed via a hybrid sources: photovoltaic generator, battery-bank and supercapacitors. The artificial neural network is trained using a rule-based energy management strategy. A simulation model for the hybrid energy system has been developed using MATLAB/Simulink. The proposed energy management controller effectively splits the load demand and achieves excellent result of the energy efficiency; therefore the energy management system can provide the steady-state and transient response required by the energy source in addition to compensate for weather conditions that will vary and will make the system store the energy with best performance on the batteries or supercapacitors.

Paper ID : 233-SS05

Title: ARTIFICIAL NEURAL NETWORK POWER MANAGER FOR HYBRID PV-WIND DESALINATION SYSTEM

Authors: Omar CHARROUF, Achour BETKA, Sabrina ABDEDDAIM, Amar GOLEA, Ahmed GHAMRI, Madiha MAAMIR
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Abstract: In this paper, Artificial Neural Network (ANN) power management for a reverse osmosis desalination unit fed by hybrid renewable energy sources solar PV and wind turbine associated to battery bank as storage element is studied. The ANN power management system has as main objective to ensure the smooth transfer of the generated power by these sources under the variability and intermittency of the wind speed and the irradiation during 24 h of operation considering the limitation constraints of the RO unit and the need water profile. The design, the modeling and the control strategies of all the components are made in this study using Matlab/simulik. The results show the ability of the ANN power manager to define the operating modes based on the proposed flow chart.

Paper ID : 240-SS05

Title: Optimal number and location of wind turbines considering cost, LFRT capability and power losses

Authors: A. Khattara, M. Becherif
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FCLAB Research Federation, FR CNRS 3539, FEMTO-ST/Energy Department, UMR CNRS 6174, University of Technology of Belfort-Montbéliard, 90010 Belfort Cedex, France.

Abstract: The studies of the wind energy integration to the power systems become more important these years due to its integration rate and the new codes adjusting this integration. This paper develops an objective function to get the optimum wind turbines locations in the network and their numbers in farms, the study aims to minimize the total energy losses during the power flow and the energy losses during a permanent fault, thus the LFRT (line fault ride through capability) maximizing is taken into account. Furthermore, this paper aims to minimize the investment cost. The objective function is programed under MATLAB and the results are validated by power flow equations and network modeling by PSAT.

ICEREGA'18: Poster Session 1

Chairmen:
Dr. Sabrina Abdeddaim, LGEB Laboratory, University of Biskra, Biskra (Algeria)
Dr. Houcem eddine Mechri, Higher Institute of Applied Sciences and Technology, Sousse (Tunisia)

Date	Time	Location
28/10/2018	12:30-13:00	Room B

Paper ID: 206-SS05

Title: Experimental Study of Sliding Mode Predictive Torque Control of Induction Motor Feed by Back-to-Back Converter with Switching Instant Optimization

Authors: N. Benounnas, M. Chebaani, A. Golea, M. T Benchouia, N. Golea, R. Boumaaraf
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Electrical Engineering Department, LGEA laboratory, Oum El Bouaghi University, Algeria

Abstract: This work presents an experimental implementation of a sliding mode predictive Torque control strategy of induction motor fed by Back-to-Back converter with Switching Instant Optimization. The objective is to evaluate the practical feasibility of this method. This strategy achieves tracking of torque, speed and flux reference induction motor, minimizing the instantaneous input reactive power present in the system and a compensation of undesirable harmonic contents of the grid current, under a unity power factor operation. A theoretical explanation of the main concepts that are used in the predictive control strategy is presented along with comments on the implementation, experimental setup, and results using an 1104 dSPACE platform

Paper ID : 232-SS05

Title: Comparative Analysis of ANN DTC and Conventional DTC for PMSM Motor - Simulation and Experimental Results

Authors: A.Ghamri, R. Boumaaraf, M.T. Benchouia, H. Mesloub, A. Goléa, N. Goléa
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Electrical Engineering Department, LGEA laboratory, Oum El Bouaghi University, Algeria

Abstract: In this paper, a Neural Network algorithm is proposed. This approach is used as an alternative to classical approaches. This strategy is applied to permanent magnet synchronous motor (PMSM) for monitoring the speed at trajectory and rejection of disturbance, we propose an approach intelligent artificial technique for improvement of Direct Torque Control (DTC) of Permanent Magnet Synchronous Motor such as artificial neural network (ANN), applied in switching select voltage vector and estimator flux and torque. This intelligent technique was used to replace, on the one hand the conventional comparators and the switching table in order to reduce torque ripple, flux and stator current. This paper presents a simulation and a practical implementation for Neural Network and conventional DTC control of PMSM using a Dspace-1104. Both simulation and experimental results show the validity of the proposed method. Besides, the system can effectively reduce flux linkage and torque ripples with better dynamic and steady performance In this paper, a Neural Network algorithms is proposed. This approach is used as an alternative to classical approaches. This strategy is applied to permanent magnet synchronous motor (PMSM) for monitoring the speed at trajectory and rejection of disturbance, we propose an approach intelligent artificial technique for improvement of Direct Torque Control (DTC) of Permanent Magnet Synchronous Motor such as artificial neural network (ANN), applied in switching select voltage vector and estimator flux and torque. This intelligent technique was used to replace, on the one hand the conventional comparators and the switching table in order to reduce torque ripple, flux and stator current. This paper presents a simulation and a practical implementation for Neural Network and conventional DTC control of PMSM using a Dspace-1104. Both simulation and experimental results show the validity of the proposed method. Besides, the system can effectively reduce flux linkage and torque ripples with better dynamic and steady performance.

Paper ID : 268

Title: SLIDING MODE CONTROL OF A GRID-CONNECTED PHOTOVOLTAIC SOURCE VIA A THREE-PHASE INVERTER

Authors: Jendoubi Abdessattar, Zoghlami Maha, Aouiti Abdelkarim and Bacha Faouzi
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Abstract: Nowadays, the global market of Photo-Voltaic (PV) systems has witnessed a great growth. For optimum efficiency, maximum power should be extracted from PV panels although that the temperature and solar irradiation are continuously changing. In addition, when they are connected to the grid, they should inject a sinusoidal current into the grid with high power factor. The purpose of this work is to study a three-phase grid connected PV system. A model of this system has been developed and a variable structure control has been used for a static converter in order to convert maximum power from the PV panels to which it is connected by operating at the Maximum Power. The performance of this control is verified by simulation results.

ICEREGA'18: SS07
Sustainable Energy Transitions and Energy Efficiency

Chairmen:
Dr. Belkhir NEGROU, Kasdi Merbah University Ouargla (Algeria)
Dr. Ala'a H. Al-Muhtaseb, Sultan Qaboos University (Oman)

Date	Time	Location
28/10/2018	10:30-12:30	Room C

Paper ID : 207-SS07

Title: EXPERIMENTAL STUDY OF THE THERMAL BUILDING PERFORMANCE OF A SOLAR WATER HEATER COUPLED TO AN ABSORPTION REFRIGERATION MACHINE

Authors: Nizar. Ayadi, Habib. Sammouda
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BP 4011 Hammam Sousse (Sousse University-Tunisia);

Abstract: The purpose of this work is to study the coupling between a system of cold production from a solar water heater and the room to be cooled (conditioned). The solar cooling system by absorption is studied experimentally through its thermodynamic performances. The use of experimental results makes it possible to define the parameters characteristic of the dual role of this system, the first of which consists of thermal comfort and the other with food refrigeration (storage of products at low temperature) while using insulating and construction materials.

Paper ID : 225-SS07

Title: COMPARATIVE STUDY BETWEEN TWO MPPT TECHNIQUES P&O AND PSO CONNECTED TO THE GRID BY USING HYSTERESIS CONTROLLER

Authors: S. Meddour, H. Laib, A. Yahia Cherif, W. Hachlfi, D. Rahem
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Abstract: Since the ambient temperature, solar irradiance and load impedance are not constant. Furthermore the nonlinearity power voltage characteristic curve of a photovoltaic (PV) it is hard to operate at the maximum power point. However, we most use a maximum power point tracking algorithm (MPPT) to reach the maximum operating point when climatic condition changing in all day. The paper presents comparative study between conventional MPPT method Perturb and Observe (P&O) and meta-heuristic optimization algorithm Particle Swarm Optimization (PSO) connected to the grid with voltage source inverted (VSI) controlled through hysteresis controller (HYST). Photovoltaic system performance is analyzed for different solar radiation profiles, the simulation using MATLAB/SUMILINK shows that PSO is more efficiency with enhancement of total harmonic distortion (THD) and the power factor by hysteresis controller.

Paper ID : 235-SS07

Title: MODELING AND SIMULATION OF SOLAR PHOTOVOLTAIC SYSTEM AND ITS PERFORMANCE ENHANCEMENT USING MPPT (P&O) TECHNIQUE

Authors: Ressa Noureddine, Omeiri Amar, Merabet Leila
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Affiliation: Badji Mokhtar University Department of Electrical Engineering, Electrotechnical Laboratory Annaba, 23000 Annaba, P.O Box 12, Algeria

Abstract: Maximum Power Point Tracking (MPPT) algorithm is an important technique used in photovoltaic (PV) power systems to ameliorate the efficiency and maximize the output power of the Photovoltaic generator (GPV) by following continually the maximum power point (MPP) under different atmospheric conditions. In this paper, the perturb and observe (P&O) algorithm method was applied to achieve the desired output power from the photovoltaic power system by integrating the PV module with the DC-DC power converter. This algorithm determines the proper duty ratio in which the DC-DC power converter must be operated. The aim of this study is to improve the efficiency of (P&O) algorithm method in order to eliminate the possibility of wasting some amount of available energy. A part of the work was devoted to the study of photovoltaic system components. The (GPV) is modeled by the mathematical equations and simulated in MATLAB software along with I-V & P-V curves characteristics taking into account the temperature and sun's irradiance. The simulation result was also designed for the (P&O) algorithm method where the efficiency value demonstrated this technique.

Paper ID : 249-SS07

Title: TECHNO-ECONOMIC ASSESSMENT OF A GRID CONNECTED HYBRID POWER SYSTEM (HPS) FOR THE LABORATORY BUILDING

Authors: H. Oueslati, S. B. Mabrouk
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Abstract: Building tomorrow with renewable energies involves selecting current and future technologies based on the energy needs of buildings and controlling the financial and environmental impacts. In the context of renovations and new construction, the integration of renewable energies will allow buildings to reduce their external energy needs, or even to be surplus production. The objective of this paper is to study the technical and economic assessment of using hybrid power system (HPS) for building. The HPS is modeled and its optimal configuration is estimated with the help of hybrid optimization model for electric renewables (HOMER).

Paper ID :152_SS07

Title: TOWARDS NET ZERO ENERGY IN ALL-ELECTRIC INDUSTRIAL AND COMMERCIAL BUILDINGS

Authors: Filipe Bandeiras, Mário Gomes, Paulo Coelho, José Fernandes
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Affiliation: Instituto Politécnico de Tomar (IPT), Tomar, Portugal
Smart Cities Research Center (Ci2-IPT), Tomar, Portugal

Abstract: The content of this paper addresses the concept of net zero energy in buildings, focusing on the definition that accounts for energy losses by converting each energy type used by the building to source energy. It presents a sample of source energy conversion factors commonly used in the United States, Canada and in some European countries. In addition, several aspects regarding the weighting system and zero energy balance are also addressed. Finally, a case study is presented to evaluate whether five distinct all-electric buildings can achieve zero energy by deploying on-site renewable sources.

Paper ID : 179-SS07

Title: GIS-BASED METHOD FOR FUTURE PROSPECT OF ENERGY SUPPLY IN ALGERIAN ROAD TRANSPORT SECTOR USING SOLAR ROADS TECHNOLOGY minlats

Authors: B. Settou, N. Settou, A. Gouareh, B. Negrou
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Affiliation: Univ Ouargla, Fac. Applied Science Dept. Mechanical Engineering Lab. Promotion and enhancement of Saharan resources (VPRS), BP 511, 30000 Ouargla, Algeria.

Abstract: Electric vehicles EVs (Fuel Cell Electric Vehicles FCEVs or Battery Electric Vehicles BEVs) fueled by clean energy offer a key pathway to reducing a global warming pollution and to avoiding the worst consequences of climate change. It could also be a significant part of reducing our fossil fuels dependence. The integration of EVs in transport sector is essentially dependent on the availability of an advancing electricity and/or hydrogen fueling stations infrastructure. This paper aims to investigate the possibility of integration of EVs fueled with electricity and/or hydrogen in the road transport sector and estimate the energy supply derived from solar irradiation by using solar roads technology. The case study is road Est-Ouest (road E-O) of Algeria. A Geographic Information System (GIS) and spatial analysis tools are combined with spatial data and technical models to affecting these calculations. The results of this study demonstrate that solar road panels, which are integrated in the road E-O, produce approximately 804.3 GWh/year equivalents to 13,778.4 tons of H2/year. Which present 97.83*106 liter of fossil fuels (Regular gasoline) saving and reducing at almost 228.72*103 tons of CO2 from Internal combustion engine vehicle operation

Paper ID: 239_V (Distance Presentation Paper)

Title: TECHNO-ECONOMIC ANALYSIS FOR RUSTIC ELECTRIFICATION IN EGYPT USING MULTI-SOURCE RENEWABLE ENERGY BASED ON PV/ WIND/ FC

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Electrical Power and Machines Department, Faculty of Engineering, Zagazig University, 44519 Zagazig, Egypt

Abstract: This paper represents an economical case study using hybrid renewable energy systems (HRES) that supply the requisite electrical load of a small-scale countryside area in Egypt. This work is to extend an economic assessment using photovoltaic (PV) in grouping with other renewable energy sources for reliable, cost-effective, and sustainable electrical energy source for rustic households in remote area at Beni-Suef province, Egypt. PV is simulated and modeled with fuel cells (FCs) and wind turbines (WT). Three combinations of HRES are presented in this research work to select the most optimum one. The combinations of the hybrid systems are PV/WT/FC, PV/FC, and WT/FC. The sizing, optimization and economic assessment of the proposed systems were done utilizing the Firefly Algorithm (FA). The achieved results from Firefly Algorithm are compared with those obtained from the Shuffled Frog Leaping Algorithm (SFLA). The selected case study area with latitude and longitude of (29.0214 N, 30.8714 E) is identified for economic viability in this work. The net present cost (NPC) of the optimal power system selected from the optimization is $2,847,108. The energy cost is about 0.47 $/kWh, while the operating cost required is to be19 $44,958.

ICEREGA'18: SS01
Progress in Energy Recovery and Energy Management

Chairmen:
Dr. Mohamad Ramadan, International University of Beirut (Lebanon)
Dr. Bashira Yousef, College of Engineering, University of Sharjah (UAE)

Date	Time	Location
28/10/2018	14:00-16:00	Room A

Paper ID : 255-SS01

Title: High performance control scheme for multifunction grid tied PV system optimized by PSO

Authors: A. KRAMA, L. ZELLOUMA, B. RABHI, M.T. BENCHOUIA
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LMSE Laboratory, University of Biskra, Algeria.
LGEB Laboratory, University of Biskra, Algeria

Abstract: This paper presents high performance control scheme for multifunction grid tied double stage PV system. It bases on model predictive power control with space vector modulation. The proposed control strategy uses a discrete model of the system based on time domain to generate the average voltage vector, at each sampling period, with the aim of canceling the errors between the estimated active and reactive power values and their references. Also, it imposes sinusoidal waveform of the current on the grid side which allows active power filtering without harmonic currents identification phase. Double stage PV system is selected due to its flexibility in control unlike single stage strategy. Sliding mode control based PSO is used to track the maximum power of PV system. It offers a better accuracy and higher robustness as compared to conventional algorithms. Concerning DC side voltage of the inverter, Anti-windup PI controller is tuned offline using particle swarm optimization algorithm to deliver an optimal performance in DC bus voltage regulation. The overall system has been designed and then validated in experimental prototype 18 based on dSpace 1104; the obtained results in different phases demonstrate the higher performance and the better efficiency of the proposed system in terms of power quality enhancement and PV power injection.

Paper ID : 257_SS01

Title: WATER INJECTION PROBLEMS IN THE FIELD OF HMD.ALGERIA

Authors: Mohamed Ali ARBAOUI, Messaoud Hassini
Corresponding Author Email: alilobady@gmail.com
Affiliation : production Département, Kasdi Merbah University, Ouargla. BP 511 Ouargla 30000, Algérie geologie Département, Kasdi Merbah University, Ouargla. BP 511 Ouargla 30000, Algérie

Abstract: The exploitation of field naturally, leads to decrease the productivity of wells, to continue this exploitation with the best conditions, it is essential to pass to the stage of secondary recovery. The injection of water in reservoir is the most used method in the recovery of oil; unfortunately, there is an incompatibility between the injection water and the reservoir water, which poses a lot of problems such as training mineral deposits. The reservoir waters may contain alkaline ions and be brought into contact with the wash water which contains sulfate ions. The injected water eventually reaches the producing wells and in these wells the mixture is made and the precipitation of barium sulfate (BaSO4) takes place. The crystals then stick in the walls of the tubings, in a process that may be similar to that of sodium chloride, but this time the problem is more serious because it is a very compact deposit insoluble in the water also in acids. Deposits which formed during production and shipping represent a real calamity against which oil producers have been fighting for several decades, deposits causing irreversible damage particularly dangerous for bottom production facilities such as surface and sometimes for the rock itself.

Paper ID : 214

Title: OUTPUT POWER LOSS OF MONOCRYSTALLINE PHOTOVOLTAIC MODULE DUE TO DUST ACCUMULATION

Authors: Mustpaha DIDA, Slimane BOUGHALI, Djamel BECHKI, Hamza BOUGUETTAIA
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Affiliation: Laboratory of New and Renewable Energy in Arid and Saharan Zones – LENREZA. Kasdi Merbah University– Ouargla, Algeria.

Abstract: In practice, PV modules performance is much lower when operating outdoors than under controlled laboratory conditions. Dust accumulation on the surface of photovoltaic modules produces power losses and consequently daily energy losses due to the glass cover transmittance decreasing. These losses in photovoltaic outputs are important in large photovoltaic power plants, especially in arid and desert areas. This experimental work aims to determine the effect of dust accumulation on performance of solar panels in arid area. In this study, two solar modules of monocrystalline silicon were installed at the University of Ouargla, Algeria. One cleaned and the other left

dusty for 8 weeks of outdoor exposure without cleaning. The experimental results showed the effect of dust accumulation in drooping of photovoltaic energy production, with decreasing by 6.10%, 0.51% and 8.41% in short circuit current, open circuit voltage and maximum power output respectively compared to cleaned PV panel.

Paper ID : 226

Title: Beneficial use of two packed beds of latent storage energy for the heating of an hydroponic greenhouse

Authors: Sara BADDADI, Salwa BOUADILA
Corresponding Author Email: sara.baddadi@gmail.com
Affiliation: CRTEn, Borj Cedria, Tunisia
CRTEn, Borj Cedria, Tunisia

Abstract: The intensive energy requirements, the mismatch between the energy supply and demand and the nocturnal temperature drops are all crucial issues in the greenhouses solar heating. This communication seeks to evaluate the effect of a solar air heater with thermal latent storage on the greenhouse microclimate by pursuing the evolution of the internal climate before and after the heating. In this context, an experimental hydroponic greenhouse and a solar air heater were realized in the Thermal Processes Laboratory in the Research and Technology Center of Energy of Borj Cédria in Tunisia.

ICEREGA'18: Regular Session 1

Chairmen:
Prof. Eduardo Pinheiro, Instituto Politécnico de Tomar (IPT), Tomar (Portugal)
Dr. Ala'a H. Al-Muhtaseb, Sultan Qaboos University (Oman)

Date	Time	Location
28/10/2018	14:00-16:00	Room B

Paper ID : 212

Title: A REVIEW STUDY ON THE MODELING OF HIGH TEMPERATURE SOLAR THERMAL COLLECTOR SYSTEMS

Authors: Ahmed Amine Hachicha, Bashria A. A. Yousef, Zafar Said
Corresponding Author Email: ahachicha@sharjah.ac.ae; ahmedamine.hachicha@yahoo.fr
Affiliation: 1University of Sharjah, College of Engineering, Sustainable and Renewable Energy Engineering Department, Sharjah, P. O. Box 5 27272, UAE.

Abstract: Concentrated solar power technologies are gaining more attention in the last two decades in order to replace the conventional power technologies and reduce their environmental impacts. Among the developed concentrating technologies, parabolic trough solar collector and solar tower are the most mature and commercial concentrating solar collectors. As part of the continuous development of these technologies, significant efforts have been deployed to assess and improve the global performance and therefore reduce their cost and make them more competitive. Numerous analytical and numerical studies were developed in this context and presented in the literature. This review aims to summarize the state of the art modeling approaches used to simulate, predict and evaluate the optical, thermal and dynamic performance of high temperature solar thermal collectors. The review includes the different analytical and ray tracing models used to determine the non-uniform flux on the receiver aperture. Energy balance models were also presented as simple and easy computational models suitable to predict the thermal performance at a reasonable time. Computational Fluid Dynamics models are more convenient to study the details of the coupled fluid flow and heat transfer in the internal and external flow. The review of dynamic models presents the lumped capacitance models which used to simulate the dynamic characteristics of the heat transfer fluid and interaction with the solar receiver under transient conditions. Different software codes are adopted to simulate the dynamic behavior of the whole plant and calculate the output power.
Finally, different features and capabilities of those various approaches are compared and reported in this review.

Paper ID : 231

Title: MAGNETOCONVECTION PROBLEMS IN NON-ISOTHERMALLY HEATED ENCLOSURES

Authors: Raoudha Chaabane, Abdelmajid Jemni
Corresponding Author Email: raoudhach@gmail.com
Affiliation: Laboratory of Thermal and Energetic Systems Studies (LESTE) at the National School of Engineering of Monastir, University of Monastir, Tunisia
2 Preparatory Institute of Engineering Studies of Monastir (IPEIM), University of Monastir, Tunisia

Abstract: Magneto hydrodynamic (MHD) flows in fluids is known to have an important effect on heat transfer and fluid flow in various energy engineering applications. Thus, MHD flows in a different boundary conditions (BCs) were carried out by lattice Boltzmann method (LBM) in this paper. The aim of this paper is to identify the ability of LBM for solving MHD flows as the effect of different BCs in the presence a transversal magnetic field. LBM was utilized for solving MHD natural convection in an open cavity while Hartmann number varies from 0 to 150 and Rayleigh number

is considered at value 10^5, with the Prandtl number altering in a wide range of Pr=0.025 and 0.71. An appropriate validation with previous numerical investigations demonstrated 16 that this attitude is a suitable method for MHD problems. Findings and results show the alterations of Hartman number influence the isotherms and the streamlines widely at different Rayleigh and Prandtl numbers simultaneously. Moreover, heat transfer declines with the increment of Hartmann number. The effect of the magnetic field on the average Nusselt number at Liquid Gallium (Pr=0.025) is also highlighted.

Paper ID : 153

Title: H Infinity-Back stepping control implementation of battery/super capacitor for electric vehicles

Authors: M. Sellali, A. Betka, S. Drid S. Abdedaim, SE. Zouzou, M. Becherif
Corresponding Author Email: mehdisellali@ieee.org
Affiliation: Electrical Engineering Laboratory LGEB, University of Biskra, Algeria
LSPIE Laboratory, Electrical Engineering Department, Batna University
FCLab FR CNRS 3539, FEMTO, Univ. Bourgogne Franche-Comté/UTBM, 90010 Belfort Cedex, France

Abstract: This paper deals with a robust control of a PMSM and the implementation of a hybrid power management strategy using battery-super capacitor system for an electric vehicle (EV). The main objective is the control of the motor by the Back-stepping approach and at the same time to perform the energy management of the hybrid system efficiently. The strategy of energy management has been implemented based on a H infinity controller to ensure the regulation of the dc bus in order to ensure the transfer of all the power. The super capacitor must be regulated around an optimal point also so that it can supply and absorb instantaneous currents during acceleration and deceleration respectively. The implementation of the control strategies is achieved on a small-scale system, controlled via two DSPACE 1104 cards. The obtained experimental results show that the proposed control strategies provide fast and high performances under different speed levels, and a flexible power sharing between the two involved power sources to cover the motor demand.

Paper ID : 155

Title: PERFORMANCE ANALYSIS OF WIND GENERATORS AND PV SYSTEMS IN INDUSTRIAL SMALL-SCALE APPLICATIONS

Authors: Eduardo Pinheiro, Filipe Bandeiras, Mário Gomes, Paulo Coelho, José Fernandes
Corresponding Author Email: mgomes@ipt.pt
Affiliation: Instituto Politécnico de Tomar (IPT), Tomar, Portugal
Smart Cities Research Center (Ci2-IPT), Tomar, Portugal

Abstract: In this work, some aspects of the performance of photovoltaic (PV) systems and wind generators are discussed. The performance of technologies of different types of wind generators is briefly explains, considering the advantages and disadvantages of each type, and for different wind speeds. Technologies that improve the performance of different PV systems are also presented in a general way. In addition, a case study is presented where is evaluated the use of wind generators and PV systems for industrial small-scale applications in the Tomar region (Portugal). The purpose of this comparison is to ensure their technical and economic evaluation leading a better choice in towards to achieve building zero net energy.

Paper ID : 247

Title: USER-FRIENDLY ICT-ENABLED APPLICATIONS FOR RENEWABLE ENERGY MANAGEMENT

Authors: Noha A. Mostafa, Mohamed Grida, Haitham S. Ramadan, Jaehyun Park
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Affiliation: Industrial Engineering Department, Zagazig University, Egypt
Department of Industrial Engineering and Economics, Tokyo Institute of Technology, Japan

Abstract: Energy management includes several activities such as transmission, storage and delivery. Traditionally, these activities were performed relatively straightforward in a linear system 'generation-transmission-distribution'. Energy dispatching used to be local and based on marginal profit and cost considerations. However, the risk levels are high due to the limited real-time information and control tools. In today's world, the grid has to adapt to various challenges and opportunities, such as: fluctuating energy prices, participatory role of customers, global pressure towards emissions reduction and integration of distributed energy resources. Hence, it was required to develop new tools that can adapt and react to these challenges. The objective of this paper is to propose a technology-based application that can support the management of renewable energy sources and improve user experience with user-friendly applications. Such approaches can change the utility-customer relationship from supplier-buyer relation to an efficient and sustainable partnership. Dynamic pricing is a strategic tool to achieve this goal along with statistical tools that can be used to analyze users' preferences and behaviors.

ICEREGA'18: Regular Session 2

Chairmen:
Dr. Haitham S. Ramadan, Zagazig University (Egypt)
Dr. A. N'Diaye, University of Technology of Belfort-Montbeliard (France)

Date	Time	Location
28/10/2018	14:00-16:00	Room C

Paper ID : 159

Title: NUMERICAL STUDY OF A METAL HYDRIDE HYDROGEN TANK BASED ON REAL OPERATING DATA

Authors: D. Zhu, Y. Ait-Amirat, A. N'Diaye, A. Djerdir
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Affiliation: FEMTO-ST, CNRS, Univ. Bourgogne Franche-Comte, UTBM FCLAB, CNRS, Univ. Bourgogne Franche-Comte Rue Thierry Mieg, F-90010 Belfort Cedex, France

Abstract: This paper presents a statistical model series based on the experimental and numerical study of the onboard hydrogen storage system. The database used in this work came from the instrumentation of real use of ten vehicles made by the Mobypost project. On the vehicles, the hydrogen storage system is constituted of the metal hydride tank and heat exchange system.
The variation of main parameters including temperature, pressure, hydrogen flow and mass are analyzed separately during charging and discharging process. By comparing the experimental database and statistical model, a reasonable agreement is obtained with acceptable errors. The statistical model could be used to describe the heat and mass transfer phenomena in detail and provides a basic comprehension of the dynamic response of an onboard hydrogen storage system in both charging and discharging states.

Paper ID : 161

Title: USE OF INSULATION AND PHASE CHANGE MATERIAL IN BUILDING STRUCTURES – EXPERIMENTS AND ANALYSIS

Authors: Ehsan Jari, Farouk Hachem, Mohammad Ramadan, Jalal Faraj, and Mahmoud Khaled
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Energy and Thermofluid Group –International University of Beirut BIU–Beirut – Lebanon
Associate member at FCLAB, CNRS, Univ. Bourgogne Franche-Comté, Belfort cedex, France
University Paris Diderot, Sorbonne Paris Cité, Interdisciplinary Energy Research Institute (PIERI), Paris, France

Abstract: This paper provides an experimental study of the use of insulation and phase change materials PCMs in building structures. It particularly presents an efficient heating system modulated with thermal insulations and phase change materials. To proceed, an appropriate experimental setup is devised. It consists of an insulated and non-insulated room models that enable direct observation of different heat transfer results between a well-insulated room with PCM (paraffin wax) and a non-insulated room. This shows explicitly how the heating-insulation-PCM system can work toward a more comfortable and efficient system where energy bills are 74% lower with an average improvement factor reaching 50% in comparison with the non-insulated model.

Paper ID : 169

Title: Electric Vehicles Charging Station Supplied by Hybrid Source; Performance and Control

Authors: F. Eltoumi M. Becherif , H. S. Ramadan , A. Djerdir
Corresponding Author Email:
Affiliation: Department of Energy, FCLab, FR CNRS 3539, Femto-ST, UMR CNRS 6174, Bourgogne Franche-Comte University/ UTBM, Belfort Cedex, France
Zagazig University, Faculty of Engineering, 44519 Zagazig, Egypt.

Abstract: Nowadays, electric vehicles (EVs) are making significant progress, but the related technology is under development. This paper proposes and analyzes a charging station (CS) supplied by hybrid sources. The CS is composed of a photovoltaic (PV), a Battery energy storage system (BESS) and a connection to the grid. With this design, the CS is capable of working as a standalone system in most cases, with electric grid assistance. The proposed control system is based on the voltage regulation of the common DC bus (MVDC), where all power supplies are connected. Therefore, based on their voltages, the PV system, the BESS and/or the grid are used to deliver the required power for the EVs batteries. To illustrate the feasibility of the suggested control, the load of four EVs is simulated at different operating scenarios. The simulation results have shown that the CS is performing as well as planned.

Paper ID : 172

Title: ELCTROMAGNETIC PROPERTIES OF LOW –PRESSURE ELECTRODELESS INDUCTIVE DISCHARGES

Authors: Ahlem ben halima, Kamel Charrada, Georges Zissis
Corresponding Author Email: Benhalima.ahlem@gmail.com
Affiliation: Unité´ d'Etude des Milieux Ionisés et Réactifs, IPEIM, 5019 route de Kairouan Monastir, Tunisia Laboratoire Plasma et Conversion d'Énergie, 118 rte Narbonne, Bât3R2, 31062 Toulouse, France

Abstract: The present work deals with a model that simulates an electrodeless lamp with argon/mercury chemistry. The plasma kinetics model equations were solved using multiphysics software with appropriate boundary conditions. The numerical modeling of inductively-coupled plasma is of crucial importance to understand the behavior of different physical quantities that characterize the ionized gases such as electrical parameters and radiative transfer. The electric and magnetic fields were handled by the electromagnetic model using the multi-turn coil method. Results are in fairly good agreement with the experiment data from literature and fit well with the expected physics of the discharge plasma.

Paper ID : 236

Title: FERRORESONANCE STUDY USING FALSE TRIP ROOT CAUSE ANALYSIS

Authors: S. Boutora, H. Bentarzi
Corresponding Author Email: ereka.dhaouia@gmail.com
Affiliation: Laboratory of Signals and Systems (LSS), IGEE, University of M'hamed Bougara, Boumerdes, Algeria

Abstract: Ferroresonance is a mysterious disturbance that takes place capriciously, causing damages to electrical equipment and personnel. It generally occurs during switching, that places capacitance in series with transformer magnetizing inductance, leading to high over-voltages which in turn cause failures in transformers, cables, and arresters. Therefore, during the last decades, a large number of papers have been dedicated to its study, but it remains hazardous and unpredictable. In this paper, the root cause analysis (RCA), which is a method of discoveringthe root causes of this disturbance, based on the fault tree analysis (FTA), is used to identify the main causes of ferro resonance, from which the problem was originated. This is an investigative process leading to the deep root of the disturbance. Once the objective is attained, conventional mitigation methods are used to avoid it. The quantitative analysis of the developed model shows a significant attenuation of this phenomenon, then, protective devices are installed as first barriers.

29th October 2018

ICEREGA 2018

Materials for energy: soft magnetic, magnetocaloric, hydrogen storage

Presented by: Prof. Dr. J. J. Suñol

Professor of Applied Physics
University of Girona, Spain

Date	*Time*	*Location :* **Amphi**	
29h October 2018	*08:30-09:30*	*ICEREGA*	*Sousse*

Biography

J.J. Suñol Martínez received the Physics degree in 1990 and the Ph.D. also in Physics in 1996 from the Universitat Autònoma de Barcelona. The postdoctoral stage was performed during 1998 at INRS-Énergie et Matériaux (Varennes, Quebec). He is Professor in Applied Physics at the Department of Physics of the University of Girona (Catalonia, Spain).

He has been the Head of the Physics department of the University of Girona (2007-2010). He's coordinator of the Materials and Thermodynamics Research group of the University of Girona and from 2015 he's the president of the Spanish group on Thermal Analysis and Calorimetry (GECAT). He is author of 200+ indexed publications (web of science), and more than 300 works presented at scientific conferences.

The research is linked to new materials for energy applications, including Fe based nanocrystalline and amorphous alloys for soft magnetic applications, alloys with magnetic shape memory for magnetic refrigeration and alloys for hydrogen storage.

Lectures Details

Concerns on advanced materials production and characterization. The talk is divided in three parts:

In the first one, it is analyzed the production of nanocrystalline or amorphous soft ferromagnetic alloys (Fe, Fe-Co or Fe-Ni based). It is known that Fe-Co alloys are known to be soft-magnetic materials due their high saturation magnetization (Ms) (up to 2.45 T), good permeability and low magnetocrystalline anisotropy. These benefits have offered to these alloys many potential applications such as ultra high-density magnetic recording media, exchange-coupled magnets, high-frequency applications or microwave devices. It has been reported that the soft magnetic properties of this alloy can be further improved by: a) refinement of the structure and/or b) annealing.

The second part includes the discussion about the Mn-Fe based and the Heusler alloys production and properties in ternary or quaternary compositions. It presents the influence of different annealing treatments on the martensitic transition and magnetic entropy change in off-stoichiometric Heusler alloy ribbons in order to tailor the MCE around RT. These alloys are of particular interest due to the existence of both direct and inverse magnetocaloric effect in a rather narrow temperature interval. The value of the entropy change depends on the difference in the magnetic state of the sample corresponding to the austenite and martensite phases and consequently is determined by the magnetic phase diagram. Along with the scientific interest of the results, these materials could be exploited in refrigeration by using positive and negative magnetic entropy changes.

The third part includes the production and characterization of hydrides in a collaborative research linked to an ERANETMED project. Doped perovskites based on manganese oxide and rare earth have attracted considerable attention due to their numerous physical properties as the ferromagnetism, change ordering and colossal magnetoresistance effect. Ceramic nanosized systems owing a wide range of applications as drug delivery, data storage, magnetocaloric effect or hydrogen storage.

ICEREGA'18: SS06
Materials for Fuel Cells and Electrochemical Storage

Chairmen:
Prof. Jilani LAMLOUMI, Université de Tunis (Tunisia)
Prof. Nouredine FENINECHE, University of Technology of Belfort Montbeliard (France)

Date	Time	Location
29 /10/ 2018	**10:00-12:00**	**Room A**

Paper ID : 223_SS06

Title: ELECTROCHEMICAL HYDROGENATION OF LAY2NI9 AND CEY2NI9 ALLOYS USED AS ANODES FOR NICKEL-METAL HYDRIDE BATTERIES transefer the paper of lam her

Authors: Yassine Ben Belgacem, Chokri Khaldi, Jilani Lamloumi
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Abstract: In the present paper, the ternary LaY2Ni9 and CeY2Ni9 alloys were prepared and served as active materials of negative electrodes in nickel-metal hydride (NiMH) battery. For this case, several electrochemical methods such as the galvanostatic charging and discharging (chronopotentiometry), the constant potential discharge (chronoamperometry), and the cyclic voltammetry. These techniques were used to investigate systematically the electrochemical hydrogenation of these electrodes, including the activation capability, discharge capacities, self discharge property, high-rate dischargeability, hydrogen atomic diffusion capability and redox parameters during activation and long cycling.
The total substitution of La by Ce in LaY2Ni9 parent alloy enhanced its number of activation cycles, an improvement in reversibility and stability in the evolution of kinetic parameters despite the decrease of its discharge capacities.
A concordance is observed between the evolution of the electrochemical discharge capacity and those of the exchange current density and the ratio during cycling for the LaY2Ni9 and CeY2Ni9 electrodes. H Da^2

Paper ID : 237_SS06

Title: CaNi4-xMnx (x=0.5, 1) ALLOYS PREPARED BY MECHANICAL ALLOYING FOR ELECTROCHEMICAL HYDROGEN STORAGE

Authors: Y. dabaki, C. Khaldi, O. ElKedim, N. Fenineche, M. Tliha, J. Lamloumi
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Department of Physics, University Faculty, Umm-Alqura University, Al-Qunfudah, Saudi Arabia.
FEMTO-ST, MN2S, UTBM, UBFC, 90010 Belfort Cedex, France. 6 4ICB-PMDM/FR FCLAB, UTBM, UBFC, 90010 Belfort Cedex, France.

Abstract: In order to improve the hydrogen electrochemical storage performance of the AB5 type electrode alloys of the CaNi5 system, a small amount of Mn was added. The CaNi4-xMnx (x = 0.5, 1) alloys were prepared by mechanical alloying for 2.10, 20, 10 30, 40, 50 and 60 hours. The effects of Mn substitution on the structure and the electrochemical characteristics of hydrogen storage of alloys were studied systematically. The structural results indicate that these alloys contain multiple structures, involving several major phases of Ni with a cubic structure, CaNi5 with a CaCu5-type hexagonal structure, CaNi3 with a PuNi3-type tetragonal structure and a residual phase MnO and CaO. The substitution of Mn results in a decrease in the CaNi5 phase and an increase in the Ni phase, and has an obvious effect on the electrochemical storage characteristics of the alloys. The CaNi4.5Mn0.5 alloy exhibits the best electrochemical discharge capacity values, and the diffusion coefficient measurements indicate that the electrochemical kinetic properties of the hydrogen electrode first increase and then decrease with the increase in Mn content.

Paper ID : 238_SS06

Title: STRUCTURAL AND ELECTROCHEMICAL HYDROGEN STORAGE PROPERTIES OF ZnFe2O4 ALLOY

Authors: Wissem Zayani, Samir Azizi, Karam S. El-Nasser, Ibraheem Othman Ali, Hamadi Mathlouthi
Corresponding Author Email: wissemzayani20193@gmail.com
Affiliation : Equipe des Hydrures Métalliques, Laboratoire de Mécanique, Matériaux et Procédés, Ecole Nationale Supérieure d'ingénieurs de Tunis, Université de Tunis. Avenue Taha Hussein, 1008 Tunis, Tunisia 2Chemistry Department, College of Science and Arts, Aljouf University, Alqurayyat, KSA
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Abstract: The spinel ferrite nanomaterial was synthesized by Sol-Gel technique. Sample morphology and structure were investigated by SEM, XRD and EDX techniques. The electrochemical behaviour of the sample was studied using chronopotentiometry technique. The electrochemical study reveals that the electrode is activated during the third cycle by taking an electrochemical discharge capacity in the order of 143 mAh/g and all electrochemical parameters evolve in practically the same direction, which proves the good electrochemical behaviour of the compound studied.

Paper ID : 166

Title: INVESTIGATION OF OPTIMAL CONTROL FOR VIBRATION AND NOISE REDUCTION IN IN-WHEEL SWITCHED RELUCTANCE MOTOR USED IN ELECTRIC VEHICLE

Authors: A. Rezig, W. Boudendouna, A. Djerdir, A. N'Diaye
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Affiliation: L2EE Laboratory, Jijel University, Algeria
FEMTO-ST Laboratory and FCLAB FR-CNRS 3539, UTBM, Belfort, France

Abstract: In this paper, an appropriated control of switched reluctance motors (SRM) is investigated to vibration and noise reduction. Vibrations are caused by the radial force acting on the salient pole of SRM. A no linear model for of SRM is developed based on FEM calculation of inductance. The fluctuation of radial force is aimed to be reduced by appropriate choice of switching method. To validate proposed technique, the vibration and noise of the motors are calculated in each case.

Paper ID : 259

Title: The electrochemical properties of the hydrogen storage of LaGaO3 perovskite-type oxide in different electrolyte concentration used as novel anode material for Ni/MH batteries

Authors: A. Kaabi, M. Tliha, C. Khaldi, A. Dhahri, J. Lamloumi
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Department of Physics, University Faculty, Umm-Alqura University, Al-Qunfudah, Saudi Arabia.
University of Monastir, Laboratory of Physical Chemistry of Materials, Monastir, Tunisia.

Abstract: In order to obtain a novel negative electrode for nickel–metal hydride accumulator, perovskite-type oxide LaGaO3 was synthesized by the sol-gel method. X-ray diffraction (XRD) analysis showed that LaGaO3 perovskite-type oxide was monophasic. This oxide crystallized in the orthorhombic space group Pnma and its electrochemical properties were systematically investigated at different concentrations of the KOH electrolyte (1M, 3M and 7 M) using chronopotentiometry, potentio-dynamicpolarization, chronoamperomertry techniques and electrochemical impedance spectroscopy (EIS) at 100 % 14 state of charge (SOC) and at 328 K [1] , [2], [3].
After 20 charge/discharge cycles of the three concentrations, the alloy structure remained perovskite. The relationship between the discharge capacity and the concentration of electrolyte as well as the electrochemical kinetic analysis indicated that the exchange current density and the hydrogen diffusion coefficient of the oxide LaGaO3 increase with the rise of the electrolyte concentration at high temperature [4].
Obviously, the discharge capacity of the oxide LaGaO3 at 328K reached its maximum value at 220 mAh. g-1 at the third cycle. Thereafter, it decreased to 12mAh g-1 and remains stable during the other 17 cycles [5].
The measurements revealed that the electrochemical performance of the LaGaO3 oxide was greatly influenced by the variation of KOH concentration. Faster activation and highest discharge capacity were achieved at KOH 7M. The kinetic properties of the working electrode were significantly improved by elevating the electrolyte concentration. The obtained results demonstrated that the discharge capacity of the oxide LaGaO3 electrodes increased with the rise of both temperature and electrolyte concentration. EIS was employed to show the affects of electrolyte concentration and temperature on the discharge capacity.

Paper ID : 203

Title: EFFECT OF LI DOPING ON THE PROPERTIES OF ZNO THIN FILMS FOR PHOTODETECTOR APPLICATION

Authors: Mohamed Salah, Samir Azizi, Chokri Khaldi, Jilani Lamloumi
Corresponding Author Email: mohamed.salah@esstt.rnu.tn
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Abstract: Zinc oxide is a II-VI semiconductor compound. It offers several key advantages such as low cost, non-toxicity, and biocompatibility. Also, it is relatively abundant and can be deposited in a variety of different ways that are commonly available. Besides, ZnO has been the subject of intensive research in recent decades due to its broad applications list (sensors, light emitting device, solar cell electrodes and optical waveguide devices) which is related to its semiconducting, opto-electrical properties such as high transparency to visible combined light. Its direct band

gap is about 3.3 eV at room temperature with high binding energy around 60 meV and intrinsic n-type conductivity, The ZnO thin films can be synthesized by various techniques, for our specimen, we used chemical spray pyrolysis method. This technique is founded on spraying a solution contains the species to be prepared, generally nitrates or chlorides which are easily soluble in water, In recent years, several properties of Li doped ZnO thin films have been studied by researchers. The impact of Li doping on the optical, structural and photoconducting properties is a subject of our investigation in this work.

Paper ID : 211

Title: EFFECT OF LI DOPING ON THE PROPERTIES OF ZNO THIN FILMS FOR PHOTODETECTOR APPLICATION

Authors: Mohamed Salah, Samir Azizi, Chokri Khaldi, Jilani Lamloumi
Corresponding Author Email: mohamed.salah@esstt.rnu.tn
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Abstract: Zinc oxide is a II-VI semiconductor compound. It offers several key advantages such as low cost, non-toxicity, and biocompatibility. Also, it is relatively abundant and can be deposited in a variety of different ways that are commonly available. Besides, ZnO has been the subject of intensive research in recent decades due to its broad applications list (sensors, light emitting device, solar cell electrodes and optical waveguide devices) which is related to its semiconducting, opto-electrical properties such as high transparency to visible combined light. Its direct band gap is about 3.3 eV at room temperature with high binding energy around 60 meV and intrinsic n-type conductivity, The ZnO thin films can be synthesized by various techniques, for our specimen, we used chemical spray pyrolysis method. This technique is founded on spraying a solution contains the species to be prepared, generally nitrates or chlorides which are easily soluble in water, In recent years, several properties of Li doped ZnO thin films have been studied by researchers. The impact of Li doping on the optical, structural and photo conducting properties is a subject of our investigation in this work.

Paper ID : 192

Title: A Robust control of a 4- leg Floating Interleaved Boost converter based on mixed Sensitivity H infinity Controller for fuel cell electric vehicle application

Authors: R. Saadi, M.Y. Ayad, M.Y. Hammoudi, O. Kraa , M. Bahri
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CISE – Electromechatronic Systems Research Centre, Universidade da Beira Interior, Calçada Fonte do Lameiro P – 6201-001 Covilhã, Portugal
R&D in Industrial Hybrid Vehicle Applications, France

Abstract: This paper presents a real time implementation of robust control strategy applied to a high voltage ratio non-isolated DC/DC converter interface a fuel cell stack and a DC bus suitable for electric vehicles applications. A four leg floating interleaved boost converter (FIBC) is used to achieve a high voltage ratio, high efficiency, a small input current undulation, and an output voltage ripple. The control of the converter is ensured by a dual loop control that consists of an outer voltage loop and an inner current loop based on S/KS mixed Sensitivity H infinity approach designed to attain the proper regulator for the converter with a high dynamic and robustness even in failure mode. The design of the proposed control is performed under Matlab-Simulink environment and validated by experimental results using 1.2-kW laboratory test bench piloted via dSPACE- 1104 single card. The experimental results have proved the efficiency and robustness of the proposed controller.

ICEREGA'18 : Poster Session 2

Chairmen:
Prof. Jilani LAMLOUMI, Université de Tunis (Tunisia)
Prof. Nouredine FENINECHE, University of Technology of Belfort Montbeliard (France)

Date	Time	Location
29/10/2018	12:00- 12:30	Room A

Paper ID : 252

Title: FIRST PRINCIPAL CALCULATION OF THE THERMODYNAMIC PROPERTIES OF SEMI-CONDUCTOR COMPOUNDs GAX (X=AS, SB, N AND P)

Authors: A. Lazazga, Y. Bouhadda, A. Ben tabet and N. Fenineche
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2 Unité de recherche appliquée en énergies renouvelables BP 88 Ghardaïa, Algeria.

3 IRTES-LERMPS/FC LAB, UTBM University, Belfort, France.

Abstract: This work aims to study the thermodynamic properties of the zinc-blende GaX (X=As, Sb, N and P) using the Density functional perturbation theory (DFPT) implanted in the ABINIT code. In fact, we have carried out the lattice dynamics study and the calculation of the constant-volume specific heat Cv and internal energy. The observed difference results between GaX elements are discussed. The agreement between our results and the available literature data (theatrical and experimental) is found to be good.

Paper ID : 229

Title: Optimization and simulation of a H-Darrieus vertical wind turbine (VAWT)

Authors: Mohamed Ali ARBAOUI, Mohamed youcef lezghem , Messaoud Hassini
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geologie Département, Kasdi Merbah University, Ouargla. BP 511 Ouargla 30000, Algérie

Abstract: This project consists of designing and testing the performance of H Darrieus Vertical Wind Turbine. This project will study the influence of different factors on the performance of a vertical wind turbine; furthermore, the results of this optimization will be simulated using ANSYS 18.2 version

Paper ID : 254

Title: Experimental Validation of Standalone Doubly Fed Induction Generator for Robust Control via Whale Optimization Algorithm

Authors: S. Soued, M. Saci. Chabani, M. Becherif, M.T. Benchouia, H. S. Ramadan, A. Golea, A. Betka
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Dept. of electrical engineering, Mohamed Khider University Laboratory L.G.E.B, Biskra, Algeria.
Zagazig University, Faculty of Engineering, 44519 Zagazig, Egypt.

Abstract: This paper presents one novel design procedure to attain the optimal parameters of Proportional-Integral (PI) controllers for a 3 kW Standalone Doubly Fed Induction Generator (DFIG) for wind turbine systems. Since the parameters of PI controllers are usually selected by classical and tedious trials-errors procedures, an optimization-based tuning problem has been formulated and successfully solved based on a proposed advanced Meta-Heuristics Optimization Techniques (MOTs), called Whale Optimization Algorithm (WOA). The WOA, nature enthused MOTs, is inspired based on the humpback whales behavior. The proposed WOA-PI controller has been improved and adapted to solve such a hard optimization problem under time-domain criteria and nonlinear operational constraints. The numerical simulation and experimental results obtained from WOA-PI are examined by a comparative study with conventional PI controller. These results show the superiority and effectiveness of the proposed method WOA-PI comparative to conventional PI controller.
The experimental results for a 3 kW DFIG and a DSPACE DS1104 card prototype DFIG are provided to validate the proposed WOA-PI controller and to demonstrate its enhanced dynamic behaviour over the conventional direct voltage control.

ICEREGA'18: SS02+SS03
Control, Optimization and Energy Management of Autonomous Vehicles
Biofuel production from Biomass grown in Arid Land Areas

Chairmen:
Dr. Okba Kraa, University of Biskra (Algeria)
Dr. Ala'a H. Al-Muhtaseb, Sultan Qaboos University (Oman)

Date	Time	Location
29/10/2018	10:00-12:00	Room B

Paper ID : 221-SS02

Title: FRACTIONAL ORDER VECTOR CONTROL OF PERMANENT MAGNET SYNCHRONOUS MACHINE

Authors: W. Hachelfi*, D. Rahem, S. Meddour, A. Djouambi
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Abstract: In this paper, a new vector control method is investigated for a Permanent Magnet Synchronous Machine (PMSM). In order to develop the conventional Vector Control theory on the variation of the rotor flux magnetic, fractional order controller (FOPID) is used in this method to obta in better response. A Bode's ideal transfer function is considered as fractional order control system in open loop, which is the reference model. A synthesis is considered to analyse the efficiency of the Fractional order Controller (PIαDβ) over a conventional PI controller. This study shows that the use of fractional order controller gives a significant performance improvement.

Paper ID : 248-SS02

Title: Performance Enhancement of an Automotive Radiator Using Nanofluids

Authors: Z. Said, Duha Zeyad Alazaizeh, Amel Mohammed Abdullah, Ahmed Hachicha, Abrar Inayat
Corresponding Author Email: zsaid@gmail.com; zaffar.ks@gmail.com
Affiliation: Department of Sustainable and Renewable Energy Engineering, University of Sharjah, United Arab Emirates

Abstract: Water and ethylene glycol (EG) are conventional coolants which have relatively poor heat transfer performance. Dispersing nanoparticles on the base fluids increases its heat transfer rate. This paper discusses the heat transfer improvement in car radiator of water and ethylene glycol (50:50) base-fluid containing two different types of nanoparticles: aluminum oxide (Al2O3) and titanium dioxide (TiO2). The thermophysical properties, the stability, the effect of surfactant, and the effect of corrosion in a copper plate were measured. Furthermore, the performance of ethylene glycol and water-based Al2O3 nanofluids as an automobile radiator coolant has been determined experimentally with two different concentration and three different flow rates. Results demonstrate that TiO2 has better thermo-physical properties than Al2O3. Moreover, the TiO2 nanoparticles have lower corrosion rate than Al2O3 nanoparticles. In addition, the thermal performance of a car radiator was investigated. The results exhibited that nanofluids undoubtedly enhanced heat transfer compared to the base fluid.

Paper ID : 178-SS03

Title: STUDY OF THE EFFECT OF PARTICLES ON THE KINETIC PARAMETERS OF A TURBULENT TWO-PHASE FLOW

Authors: Mariem Bayoudh, Touati Hazem, Ben N'Ticha Hmaied,
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Abstract: Numerical simulations using a two-fluid Eulerian model were performed for two-dimensional axisymmetric jets from a circular 20 mm diameter nozzle. The particle size is between 30 and 180 µm and the particle charge ranges from 0.1 to 1. The modulations of the flow structures and the turbulent characteristics of the gas flow due to the solid particles with different sizes and rates of particle loading are studied. The jet spread and the decay of the mean center line velocity are calculated for all sizes and particle loading rates considered in this study. Additions of solid particles in the gas flow significantly modulate the turbulence of the gas in the nozzle as well as the flow rates. Fine particles suppress turbulence, while coarse particles improve turbulence

Paper ID : 261-SS03

Title: EFFECTS OF THE COMBUSTOR SIZE ON THE FLUIDIZED BED HYDRODYNAMICS OF A NOVEL MULTI-STAGE BIOMASS GASIFIER

Authors: M. Dhrioua, W. Hassen, L.Kolsi, V. Anbumalar, M. N. Borjini
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Department of Mechanical Engineering, College of Engineering, Haïl University, Haïl City 2240, Saudi Arabia. Department of Mechanical Engineering, Velammal College of Engineering and Technology, Madurai, Tamil Nadu 625009, India.

Abstract: cold flow model was developed to understand system dynamics and parameters of a multi-stage fluidized bed gasification reactor. In this work, a computational fluid dynamics (CFD) study was conducted using the Eulerian-multiphase model approach to study fluid dynamics in the combustion and gasification zones that were superposed and separated by a gas distributor. Isothermal non-reactive, turbulent and unsteady gas-solid flow was assumed. Effects of the combustor size have been studied. The tested heights were: 0.2 m, 0.4 m and 0.6 m. The influences of the combustor height and the fluidization velocity on the gas flow and the bed hydrodynamics on the gas and solid velocity, solid volume fraction and the granular temperature have been investigated. A special care was allowed for the gas distributor. Results showed that for a height L=0.2 m, the volume of the combustor was not sufficient to make the gas distribution uniformed. For L=0.4 m and L=0.6 m, the gas velocity vectors were associated with a recirculation zone below the distributor that could be useful to increase the residence time of the gas in the combustor. Bubbling, slugging and turbulent flow regimes were observed by varying the gas inlet velocity. For a small fluidization velocity, a height of 0.6 m gave the better solid and bubbles distribution.

Paper ID : 156-SS03

Title: Solketal synthesis from Phoenix Dactylifera kernael oil bio-glycerol

Authors: Ala'a H. Al-Muhatseb, Farrukh Jamil, Lamya Al-Haj, Mohammed Al-Abri, Mohamed Becherif
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Affiliation: Department of Petroleum and Chemical Engineering, College of Engineering, Sultan Qaboos University, Muscat, Oman
Department of Chemical Engineering, COMSATS Institute of Information Technology, Lahore-Pakistan
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Department of Energy, FCLab, FR CNRS 3539, Femto-ST, UMR CNRS 6174, Bourgogne Franche-Comte University/UTBM, Belfort Cedex, France

Abstract: Bio-glycerol is considered as high boiling polar triol and immiscible with fossil fuel fractions due to which it is transformed into its respective ketals and acetals. These, help to improve the quality of diesel emitting less amount of aldehydes and carbon monoxide. Solketal visual appearance is transparent and it is odorless organic liquid used as fuel additive for diesel to improve its cold flow properties. In present study, condensation of bio-glycerol with acetone in presence of beta zeolite has been done for synthesizing solketal. It was observed that glycerol conversion and selectivity of solketal was largely effected by temperature, as it increases from 40 ºC to 60 ºC the conversion of glycerol rises from 80.04 % to 94.26 % and selectivity of solketal from 80.0 % to 94.18 % but further increase in temperature to 100 ºC glycerol conversion reduced to 93.06 % and solketal selectivity to 92.08 %. At the optimum conditions, the bio-glycerol conversion and solketal yield were about 94.26% and 94.18wt% respectively. This process offers an attractive route for converting bio-glycerol, the main by-product of biodiesel to solketal with acetone; a value-added green product with potential industrial applications as a valuable green fuel additive and combustion promoter for gasoline/diesel engines.

Paper ID : 185

Title: Improvement of the Maximum Power Point Tracker for Photovoltaic Generators with Particle Swarm Optimization and Fuzzy-Sliding Mode Techniques under Partial Shading Condition

Authors: M.F. Arroussi, A. Arif, A. Guettaf , A.J.M. Cardoso, R. Saadi
Corresponding Author Email: larou.farouk@gmail.com
Affiliation: Department of Electrical Engineering, MSE Laboratory, Mohamed Khider Biskra University, Algeria
CISE – Electromechatronic Systems Research Centre Universidad da Beira Interior, Covilhã, Portugal

Abstract: This paper proposes new Particle Swarm Optimization and Fuzzy-Sliding Mode methods to improve the Maximum Power Point Tracking (MPPT) capability for Photovoltaic system under Partial Shading Condition (PSCs). The classical Maximum Power Point Tracking (MPPT) algorithms are designed to track the MPP. Despite many review papers have discussed the conventional techniques such as Perturb and Observe, Hill Climbing and Incremental Conductance (IC) methods, in our work we present novel techniques to improve the control's performance optimization of the PV system which consists of a photovoltaic generation system (PGS), a buck-boost converter (DC-DC) and load. Simulation of different parts of the system are developed in Matlab/Simulink environment, thus allowing to obtain satisfying results for the performances of the two studied controllers – Fuzzy Logic Control (FLC), and Particle Swarm Optimization (PSO). These algorithms of MPPT associated with a variation of irradiance conditions, disclose an evident improvement of controlling the MPPT performance of PVS when the PSO tracking technique is applied.

Paper ID : 244-SS02

Title: EXPERIMENTAL VALIDATION OF DIFFERENTIAL FLATNESS USING THE PREDICTIVE NEURAL NETWORK CONTROL LAW FOR HYBRID POWER SYSTEM

Authors: I. Tegani, O. Kraa, M.Y. Ayad, A. aboubou, M. Bahri and A. Khattara
Corresponding Author Email: tegani.ilyes@yahoo.fr
Affiliation: Ecole supérieure de technologies industrielle- Annaba, Laboratory of Energy Systems Modelling, University of Mohamed Khider, Biskra, Algeria Industrial Hybrid Vehicle Applications, France.
Laboratory of Energy Systems Modelling, University of Mohamed Khider, Biskra, Algeria

Abstract: This paper proposes an experimental validation of hybrid renewable energy source supplied by a fuel cell (FC) as a main power source, photovoltaic panel (PV) as the secondary source, with a battery (Batt) storage device for distributed generation system in electrical vehicle. The energy in hybrid system has swung by the dc bus voltage regulation through a nonlinear approach based on the differential flatness property and the predictive neural network (PNN) control law. A battery unit, which offering high energy density device, intervenes for supplying energy in the cases of power's lack. The control technique used in this work guaranties the complete description of the state's trajectories; consequently, the dynamic respond, stability and robustness of the proposed hybrid system has been ameliorated by reducing the static error in the output DC bus voltage. The control law of this method has been enhanced via PNN to confirm a better tracking for the reference path signals. To validate the proposed approach (flatness-PNN), a test bench has realized with electronic circuits, and digital assessment has been accomplished with a dSPACE 1104 unit. Experimental results with small-scale devices (which includes fuel cell emulator FC of 1200 W, 46 A, Lithium-ion batteries of 48 V and solar source with 480 W) verify the excellent control results during a multiple charge variation.

ICEREGA'18: Poster session 2

Chairmen:
Prof. Ahmed Ghamri, University of Mohamed Kheider (Algeria)
Dr. Noha Mostafa, Zagazig University (Egypt)

Date	Time	Location
29/10/2018	12:00-12:30	Room B

Paper ID : 217_SS04

Title: Electronic and Optical Properties of PbS Semiconductor: DFT approach

Authors: F. Z. Fouddad, S. Hiadsi, L. Bouzid, Y. F. Ghrici
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Affiliation: Laboratoire de Microscope Electronique et Sciences des Matériaux, Université d'Oran des sciences et de la technologie -USTO- Mohamed Boudiaf, Faculté de physique, Département de génie physique.
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Abstract: The IV-VI semi-conductors compounds have been extensively studied in recent years because of their wide applications in optoelectronic devices, and in the renewable energy field. Lead chalcogenide PbS has undergone several experimental and theoretical work. As a result, a Full-Potential Linearized Augmented Plane Wave calculation within the density functional theory is performed to investigate the electronic and optical properties of cubic PbS. The exchange-correlation potential is treated by two approximations, the local density approximation (LDA) and the generalized gradient approximation (GGA) to calculate the structural properties. The electronic and optical properties of PbS compound are well predicted by the exchange-correlation potential GGA. The computed structural parameters are found to be in good agreement with experimental and theoretical data. The real and imaginary parts of the dielectric function, refractive index, reflectivity and absorption coefficient are discussed on the basis of the energy band structure and the calculated density of states, the results obtained are predictive and serve as good references for future experimental work.

Paper ID : 251-SS04

Title: Hydrogen storage tanks simulation

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Abstract: Hydrogen storage has been a subject of intensive research for many years. Currently, hydrogen can be embedded in vehicles using a variety of technologies: a) compressed hydrogen, liquefied nitrogen and solid hydrides [1]. The usual way of storing hydrogen is in a high-pressure tank. Before building a tank to store hydrogen under pressure it is interesting to simulate its behavior to prevent excessive deformation or fracture. In this work, several tanks have been simulated using the ANSYS software. The geometries chosen have been two: a) oval or b) cylindrical. On the other hand, the selection of materials and geometrical aspects such as the thickness of the walls has been analyzed. Pressures of up to 100 MPa have been simulated. In all the cases analyzed, the same criterion has been

used to define a safety factor. The study does not pretend to be exhaustive. However, it allows to verify the utility of the ANSYS software in the modeling of hydrogen storage tanks.

Paper ID : 182-SS01

Title: PRELIMINARY HAZARD IDENTIFICATION FOR RISK ASSESSMENT ON A COMPLEX SYSTEM OF HYDROGEN PRODUCTION

Authors: HADEF Hefaidh, Belkhir NEGROU, Tomás González Ayuso and DJEBABRA Mébarek
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[4]LRPI Laboratory – IHSI Institute, University of ChahidMostepha Ben Boulaid - Batna 2, Algeria

Abstract: Electricity generation plants from renewable sources are in continuously expanding due to the more than likely depletion of fossil fuels and increasingly demanding anti-pollution policy. Among the best renewable source of energy is hydrogen, Hydrogen energy is promising in more ways than one. Nevertheless, its exploitation on an industrial scale is in its infancy. But the safety of the hydrogen chain is the major issue for researchers, new challenges each day to improve the utilization of the Hydrogen energy; in this article we did preliminary hazard identification for risk assessment on a complex system of hydrogen production “EGA-9000” at CIEMAT. We did our study by two analyzes, functional analysis of the FAST 14 method, to facilitate the second analysis is that the dysfunctional analysis by HAZOP method, to extract the possible drift in this system and we found that the major risk in this system is the risk of formation of explosive atmospheres (fire and explosion) and the safety barriers installed are insufficient to deal with it, for this purpose, we proposed recommendations based on the results obtained by HAZOP method analysis.

Paper ID : 208

Title: A DYNAMIC MODEL OF A SELF-EXCITED INDUCTION GENERATOR TAKING IRON LOSSES INTO ACCOUNT APPLIED TO WIND ENERGY

Authors: M. Si brahim , R. Rouas , S. Haddad, N. Benamrouche
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Affiliation: LATAGE Laboratory, Mouloud MAMMERI University, Tizi-Ouzou, Algeria

Abstract: This paper deals with the development of a dynamic model of a stand-alone self-excited induction generator (SEIG) taking into account iron losses. It is well known that for stable operations, the SEIG has to operate in the region of magnetic saturation. As a consequence, in any accurate analysis, iron losses must be included. This is particularly the case for small induction machines, where the magnitude of the current in the resistance representing the iron losses can not be neglected compared to that of the magnetising current. The iron losses are represented by means of inserting an equivalent loss resistance in the equivalent circuit of the SEIG, where three places are commonly used: in parallel with the magnetising inductance, before the stator leakage inductance or before the stator resistance. On this basis, three models were developed. They are applied to two different power induction generators; a 3kW wound rotor machine and a 1.1 kW squirrel cage machine. An experimental investigation is carried out to compare the performances of these three models in terms of accuracy and time consumption.

ICEREGA'18: SS04

Hydrogen Storage Materials and Tank Prototyping

Chairmen:
Prof. Joan Josep SUÑOL, Universitat de Girona 4, University of Girona (Spain)
Prof. Safia ALLEG, UBMA, Badji Mokhtar-Annaba University (Algeria)

Date	*Time*	*Location*
29/10/2018	**10:00-12:00**	**Room C**

Paper ID : 187-SS04

Title: HIGH PHOTORESPONSE OF ULTRAVIOLET PHOTODETECTOR BASED ON NI DOPED ZNO NANOPARTICLES

Authors: I. BEN ELKAMEL, N. HAMDAOUI, A. MEZNI, R. AJJEL, L. BEJI and H. Sammouda
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Institut Supérieur des Technologies de l'Informatique et de la Communication, Université de Sousse, Gp1, 4011 Hammam Sousse, Tunisie.
Unite de recherche "Synthèse et Structure de Nanomatériaux" UR11ES30, Faculté des Sciences de Bizerte,Université de Carthage, 7021 Jarzouna, Tunisia.

Abstract: This study involves a novel fabrication of high responsivity, fast response, and low-cost (UV) photodetector (PD) based on ZnO/Ni nanoparticles deposited on a glass substrate. The ZnO/Ni nanoparticles were synthesized using polyol process. The structure and the morphology of the samples were characterized by X-ray Diffraction (XRD) and Transmission Electron Microscopy (TEM). Optical properties were performed using UV-visible, diffuse Reflectance and photoluminescence spectroscopy (PL). The photodetector exhibited high photoresponse characteristics under 375nm laser excitation. Our device shows a high responsivity (121 A/W) with rise time about (5.52 s) and fall time about (12 s) at bias voltage 1 V. The noise spectra obtained from the UV photodetector were caused by the 1/f noise. The noise-equivalent power (NEP) is 1.08.10-9 W. Thus, the polyol process can be a useful and effective method for improving the performance of ZnO/Ni UV photodetectors

Paper ID : 199-SS04

Title: Diatomite based composites for thermal energy storage

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Abstract: Due to its unique 3D porous hierarchical architecture and high surface area, diatom silica a 3-dimensional (3D) natural biomaterial, generated from single cell algae with nano and micro-morphologies and patterns, has received important research attraction as a low cost natural electrode material for energy storage and production. The present work is devoted to the study of the impregnation of the diatomite with a mixture of paraffin wax (PW) and liquid paraffin (LP) in order to obtain composite phase change materials (PCMs) with a melting temperature below 30°C and an appropriate latent heat. Structure, microstructure and thermal properties have been studied by X-ray diffraction (XRD), scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FT–IR), differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA). The paraffin/diatomite composites PCMs exhibit a melting temperature of 28.44°C and a latent heat of about 56.40 J/g. furthermore, due to their thermal reliability and thermal energy storage performance after thermal cycling, the prepared composites PCMs are good candidates for thermal energy storage in buildings

Paper ID : 191

Title: On the Application of H∞ Control to Three Phase Interleaved Boost Converter for Fuel Cell Systems

Authors: M.Y. Hammoudi, M.Y. Ayad, R. Saadi, O. Kraa , M. Bahri
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MSE Laboratory, University of Biskra, Algeria.

Abstract: A step-up non-isolated DC-DC converter for fuel cell electric vehicle applications is proposed and controlled. This paper describes the practical implementation of an H infinity control based mixed sensitivity method applied to a three-phase interleaved boost converter for fuel cell applications. Basing on the small signal ac modeling, an H infinity controller based mixed sensitivity is developed for an outer voltage loop and inner current loop, which guaranteeing the high stability for any operating conditions, especially, the dynamic responses. The H infinity controller for the fuel cell systems is achieved by a digital signal processor to improve the excellent reference tracking and disturbance rejection properties.

Paper ID : 194

Title: A MOBILITY-RELATED VEHICULAR COMMUNICATION SYSTEM BASED ON NON-ORTHOGONAL MULTIPLE ACCESS

Authors: F. Benabdallah, A. Hamza, M. Becherif, S. Benslimane, S. Damous
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Abstract: Recently, with the evolution of mobile and wireless communication, vehicular networks have attracted a special attention and have been considered among the most important services in the next generation wireless networks 5G. In order to support V2X (Vehicle to everything) applications, many works are being conducted. In this paper the use of NOMA (Non-Orthogonal Multiple Access) in a Vehicle-to-Infrastructure (V2I) communication system is investigated taking into account vehicles mobility on which the power allocation scheme is based in this proposal. Moreover, with the emergence of electric vehicles, the energy consumption is a critical factor to be taken into consideration when proposing new communication schemes. Thus, the system is evaluated based on spectral efficiency (SE) and Energy efficiency (EE). The obtained results show that NOMA outperforms OMA in terms of spectral efficiency as well as energy efficiency. In fact, the energy is substantially consumed by the hardware however, NOMA shows the ability to adapt the transmission strategy in order to improve efficiency in terms of energy consumption.
Keywords: NOMA, V2I, mobility, spectral efficiency, energy efficiency.

Paper ID : 271

Title: Hydrogen solid storage: First-principles study on ZrV_2H_{16}

Authors: Mohamed Amine Lahlou Nabil, Nouredine Fenineche, Ioana Popa, Youcef Bouhadda
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Abstract: Hydrogen is the most environmentally friendly and clean energy. Indeed, the hydrogen can be produced from renewable energy resources (such as photovoltaic electrolyzers), then can be used or stored. The widely most used techniques to store hydrogen are either in gaseous or liquid form but they are expensive and unable to ensure greater safety. In the last few decades, metallic hydrides have been studied for hydrogen storage. The Laves phase intermetallic compounds are good candidates for hydrogen storage. In this study, we investigate the electronic properties of new metallic hydride ZrV_2H_{16} for hydrogen storage using first principles calculations. to the knowledge of the authors this hydride has never been reported before in the literature. The cell parameters, crystal structures and mechanical properties are determined. Cohesion energy of this hydride is also predicted by FP-LPAW method as implemented in Wien2K code [1]. To gain further insight for deeply understanding the electronic properties, a calculation of density of states is made. The study of the metallic system before adding hydrogen atoms is in good agreement with experimental and previous calculations.

Paper ID : 170

Title: Investigation of the Temperature Effect on the Electrical parameters in 2 Photovoltaic Module

Authors: N. Khelfaoui , A.Djafour , K.Boualic, A.Gougui, H.Boutelli
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Abstract: To predict the I-V characterization, of the photovoltaic module, it treats the five parameters which concern the photovoltaic module. The most important terms, that controlled the photovoltaic module are the solar irradiance level (E) and the temperature (T), this last for the region .While our experiment was conducted in Ouargla City. The aim of this paper is to investigate the effect of the temperature term on the electrical performances as the open circuit voltage (Voc), short circuit current (Isc), optimal power (Pm), Fill Factor and the efficiency. The increase of the temperature affect negatively on some electrical parameters of the photovoltaic module, while the values of the temperature proportionally inverse with the open circuit voltage.

Paper ID: 218_V (Distance Presentation Paper)

Title: Performance evaluation of a locally modified PV module to a PVT collector under semi-arid climatic conditions

Authors: Billel Boumaaraf, Houria Boumaaraf, Mohamed Salah Ait-cheikh, Khaled Touafek, Mohamed El Amine Slimani
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Laboratoire de Mécanique des Fluides Théoriques et Appliquées, Département Energétique et Mécanique des Fluides,Université des Sciences et de la Technologie Houari Boumediene, 16111 Algiers, Algeria

Abstract: In this paper a designed serpentine thermal collector is applied on the back of a PV module locally fabricated, to use electricity and at the same time produce heat energy. A mathematical model has been developed to draw the output behavior of the hybrid system and estimate carefully its efficiency. This mathematical model, as well as the study of energy performance, has been evaluated thru a simulation under the MATLAB environment. This system has been validated through an experimental prototype. The experimental tests were performed under outdoor condition and were used for verification and validation of the theoretical study. The values of the thermal and electrical efficiencies reached 61%, 7%, respectively. The theoretical model has given a good results and good approach to the experimental prototype.

ICEREGA'18 Plenary Speech

Chairman: Advanced Control Techniques for UAV Systems

Presented by: Prof. Dr. Ahmed Rhif

University of Carthage – Laboratory of Advanced Systems, Tunisia

Date	*Time*	*Location :* Amphi	
30th October 2018	*8:30-9:30*		

Biography

Dr. Ahmed Rhif (Tunisia) is a Researcher PhD-Engineer on Electrical Engineering. He has several years of experience on Scientific Research, Teaching and industrial projects. Ahmed Rhif has worked as a Technical Responsible Chief in LEONI (International Leader of Wiring Fibers Companies) and has occuped also the task of Project Manager and Method Engineer in both SMSI (electronic development industry) and CABLITEC (Engineering automobile company). Then he was a Lecturer at both the Private University of Sousah (UPS) and the High Institute of Applied Sciences and Technologies of Sousah (ISSATso) and now he is working as Lecturer in the High Institute of Applied Sciences and Technologies of Al Qayrawan (ISSATk). His research interests include Modelling, Control Systems and Engineering as well as the conception and realization of embedded systems and electronic cards and the implantation of the international standard of quality (ISO-TS 16949). He has published a Book and several papers in International Conferences and International Journals. He is currently serving as editor and reviewer of several International Journals. He is also a Founder and general chair of some reputed international conferences such as: CEIT –CIER – ACECS – IEM – BEMM and GEEE.
Ahmed Rhif is the Founder and the Dean of the International Publisher & Co (IPCO).

Resume

The Autonomous Underwater Vehicles (AUVs) can be indexed in two classes depending on the immersion depth. We will speak then about AUVs coastal and AUVs deep seas. From a few hundred meters of depth, the dimensions structure and the AUVs characteristics change. This limit of depth will separate the vehicles deep seas from the coastal vehicles. Today, the underwater robots are an integral part of the scientific equipment for seas and ocean exploration. Many examples showed that ROVs (Remotely Operating Vehicles) and AUVs (Autonomous Underwater Vehicles) are used in many fields and this for various applications like the inspection, the cartography or bathymetry. However, we can distinguish a limiting depth for the various types of existing autonomous underwater machines. Indeed, starting from 300 meters, the structure, dimensions and the characteristics of these vehicles change. We have, on a side, AUVs Hugin 3000 type of Kongsberg Simrad, the Sea Oracle of Bluefin Robotics or Alistar 3000 of ECA, which can reach depths of 3000 meters, have a very great autonomy, considerable dimensions and a weight which requires an important logistics. On another side, AUVs of Remus Hydroid or Gavia Hyfmind types, with much less autonomy, but of reduced dimensions and logistics and with good modularity capacities that seems to be the perfect tool for the exploration of not very deep water. In this context, the LIRMM and the Eca-Hytec company became partners to develop the first prototype of the AUV H160.This prototype was developed to surf and position with the using a GPS. On surface, the torpedo must be able to transmit the mission's data. The applications concerned are the inspection, bathymetry, the chemical data acquisition or sonar and video images. The machine will have also the possibility of surfing between 1 and 2 meters of depth with quasi no angle of pitching.

The talk treats some analytic tools for a rigorous control formulation and stability analysis of sliding mode-multimodel controller (SM-MMC). In this way to minimize the chattering effect we will adopt as a starting point the multimodel approach to change the commutation of the sliding mode control (SMC) into fusion using a first order then a high order sliding mode control with single sliding surface and, then, with several sliding surfaces. For that the stability conditions invoke the existence of two Lyapunov-type functions, the first associated to the passage to the sliding set in finite time, and the second with convergence to the desired state. The approaches presented in this work are simulated on the immersion control of a submarine mobile which presents a problem for the actuators because of the high level of system non-linearity and because of the external disturbances.

ICEREGA'18: Regular Session 4

Chairmen:

Prof. Abdel Aitouche, University of Lille (France)

Dr. Haitham S. Ramadan, Zagazig University (Egypt)

Date	Time	Location
30/10/2018	10:00- 12:00	Room A

Paper ID : 188

Title: Finite Element Modeling and Analysis of a 6/2 Poles Brushless Doubly-Fed Induction Machine

Authors: I. Nezzari, A KESSAL
Corresponding Author Email: id.nezzari@gmail.com
Affiliation: LPMRN LAB University of BBA, El Annasser 34030, Algeria

Abstract: Recently a new machine topology called BDFIM Brushless Doubly-Fed Machine has been proposed to compete with Doubly-fed induction machine DFIM. The stator of this machine carries two independent three-phase windings with a different number of poles. Its functioning is conditioned by certain physical constraints, i.e. the relation between the speed of the rotor, the polarities of the two windings and their frequencies. In this paper, a finite element model was developed for the study of the machine (2.2KW and 1/3 pairs of poles) on Flux2d, analyzing its behavior in asynchronous induction motor mode and dual supply mode (synchronous).

Paper ID : 264_SS04

Title: Fault Tolerant Control of Two-Time Scale Delayed Systems with Respect to Additive Faults

Authors: Zina BOUGATEF, Abdelouhab AITOUCHE, Nouceyba ABDELKRIM and Mohamed Naceur ABDELKRIM
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Affiliation: National Engineering School of Gabs ENIG, University of Gabs,Tunisia,
University of Gabs, Tunisia, LR-MACS member, Tunisia

Abstract: The problem of fault estimation and control approach for a two-time-scale systems with time delay, is investigated in this paper. This new approach consists on constructing a PI observer in order to estimate states and faults firstly and to design a control law secondly. The control scheme is based on the Lyapunov stability theory and the technique of Linear Matrix Inequalities (LMI). The effectiveness of the proposed method is illustrated via a simulation example.
Index Terms—two-time scale singularly perturbed system, time-delay, additive faults, LMI, trajectory tracking.

Paper ID : 262

Title: A REVIEW ON PHASE CHANGE MATERIALS FOR THERMAL ENERGY STORAGE IN BUILDINGS: HEATING AND HYBRID APPLICATIONS

Authors: Khaireldin Faraj, Mahmoud Khaled, Jalal Faraj, Farouk Hachem, Cathy Castelain
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Laboratory of Thermal and Energy of Nantes, LTEN, Polytech of Nantes, University of Nantes, Nantes, France

Abstract: Phase change materials (PCMs) gathered the attention of researchers and architects world-widely for its prodigious benefits in increasing the share of renewable energy, providing desired thermal comfort in buildings, achieving valuable reduction in energy consumption and contributing to the diminish of environmental pollution. Buildings, being the most demanding sectors of energy broadly, especially for heating and cooling purposes, are being exposed to the PCM technology by several applications. The current article reviews recent literature on the use of PCMs as thermal energy storage systems (TES) in buildings for heating and hybrid applications. A summary of the used PCMs is also presented with their respective applications, incorporation methods and basic thermo-physical properties are presented. It was shown that the applications of heating are promising, however, research of combined applications and combined PCMs are still required, and more experimental analysis of commercial buildings, in priority, are lacking.

Paper ID : 260-SS01

Title: Optimum Dynamic Distribution Network Reconfiguration Considering Loads and Photovoltaic Production Variation using Kruskal's Algorithm

Authors: A. Khattara, M. Mosbah, M. Becherif
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Abstract: Distribution network reconfiguration is considered among the important functions in smart grids. This reconfiguration defined as changing the network topology by opening and closing the looping switches. The network reconfiguration can be static or dynamic. Photovoltaic sources integrated into the network produce a variable power due to the variation of the radiation and the climatic conditions during the day, this integration can affect on the dynamic reconfiguration of distribution network. novel application of graph theory supported by Kruskal's spanning tree algorithm is developed to determine the optimal dynamic reconfiguration considering the load variability and PV production variability. The objective function of this study is to minimize the losses of the active power by dynamic reconfiguration of the network considering the power flow constraints.
The proposed method was tested on two different IEEE distributions systems (33 bus and 84 bus) then validated on an Algerian distribution network under MATLAB software.

Paper ID : 184

Title: SITE SELECTION METHODOLOGY FOR THE WIND-POWERED HYDROGEN REFUELING STATION BASED ON AHP-GIS IN ADRAR, ALGERIA

Authors: Djilali Messaoudi, Noureddine Settou, Belkhir Negrou, Soumia Rahmouni, Ishak Mayou.
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Affiliation: Univ. Ouargla, Fac. Applied sciences, Dept. Mechanical Engineering, Lab. Promotion et valorisation des ressources sahariennes (VPRS) BP 511, Route de Ghardaïa, Ouargla, 30000, Algeria

Abstract: This paper deals with site selection problems for hydrogen production plants and aims to propose a structural procedure for determining the most feasible sites. The study area is Adrar province, Algeria which has a promising wind potential. The methodology is mainly composed of two stages: the first stage is to evaluate and select the best locations for wind-powered hydrogen production using geographical information systems (GIS) and multi-criteria decision-making (MCDM) technique. An analytical hierarchy process (AHP) is applied to weigh the criteria and compute a land suitability index (LSI) to evaluate potential sites. And the second stage is applying different filtration constraints to select the suitable petrol stations for such hydrogen refueling station 16 modification. The result map showed that the entire Adrar province is almost suitable for wind-powered hydrogen production with varying suitability index. The LSI model groups sites into three categories: High suitable areas, Medium suitable areas, and Low suitable. By applying the constraints, about 4 stations are suitable for wind-powered hydrogen refueling system retrofitting in Adrar province.

ICEREGA'18: Regular Session 5

Chairmen:
Prof. Mohamed T. Benchouia, University of Mohamed Kheider (Algeria)
Dr. Mohamad Ramadan, International University of Beirut (Lebanon)

Date	Time	Location
30/10/2018	10:00-12:00	Room B

Paper ID : 263

Title: USE OF PHASE CHANGE MATERIALS THERMAL ENERGY STORAGE SYSTEMS FOR COOLING APPLICATIONS IN BUILDINGS: A REVIEW

Authors: Khaireldin Faraj, Mahmoud Khaled, Jalal Faraj, Farouk Hachem, Cathy Castelain
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Laboratory of Thermal and Energy of Nantes, LTEN, Polytech of Nantes, University of Nantes, Nantes, France

Abstract: Sharing of renewable energy and reduction of conventional energy consumption as attempts in ameliorating environmental issues such as global warming became the main concern for current developing scientific engineering research. And, with the remarkable increase in the cooling and heating demand in the building sector world widely, the need of a suitable technology that permits to the improvement of building thermal performance. Utilizing phase change materials (PCM) as thermal energy storage strategies in buildings can meet the potential thermal comfort requirements when selected properly. The current research article presents an overview of different PCM cooling applications in buildings. Active and passive classifications are presented. A summary of the used PCMs

and their respective properties are also offered. Studied systems are proved to be efficient in reducing indoor temperature fluctuations and energy demand during cold seasons, with the capability of triggering load reduction or shifting.

Paper ID : 270

Title: Review on Solar Water Heating System

Authors: A.Herez, M. Khaled, H. EL Hage, T. Lemnand and M. Ramadan
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Associate member at FCLAB, CNRS, Univ. Bourgogne Franche-Comte, Belfort cedex, France

Abstract: Solar water heating is a promising application of solar energy. It utilizes this renewable energy to produce hot water that can be used for several purposes and in different places (houses, hotels, hospitals, etc.). Such application serves in mitigating the dependence on conventional energy sources that are depleting day after day and replace it by using renewable source of energy which is environmentally friendly. The aim of this paper is to present a brief review on solar water heating systems. The review includes demonstration of the principle of solar water heating systems. Also, classification of such system is exposed in addition to the mode of operation of each type.

Paper ID : 228

Title: Effects of Chromium incorporation on the structural and optical properties of NiO sprayed thin films

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Abstract: NiO thin film were fabricated by spray pyrolysis using aqueous solution of nitrate Nickel .Nickel oxide thin film were deposed on ITO substrate at 500°C. The effect of Cr doping on structural and optical properties was investigated .The RX diffraction shows that the pure and Cr doped NiO have a preferential orientation along the (111) plan [1]. The chromium induced decrease in crystallite size from 4.1932Å to 4.1679Å. The addition of chrome led to decrease in intensity of diffraction peak. This reduction is related to the substitution between the Cr2+ and Ni2+ without deteriorating the crystal structure [2.3]. UV-visible characterization demonstrates that the Chrome improve the transparency of film by the increase of transmittance with Cr concentration. NiO thin films present direct band gap energy value lying in the range of 3.4-3.8 eV. The Pl measurement reveals the presence of peaks related to the electronic transition of the Ni2+ ions and others confirming the presence of some defects in NiO matrix in terms of Cr content.

Paper ID : 245

Title: PARAMETRIC STUDY OF NATURAL CONVECTION OF NANOFLUIDS FOR HEAT TRANSFER ENHANCEMENT IN ENGINEERING APPLICATIONS

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Abstract: After the development of nanotechnology in the early 90's, it appears a new type of suspension, containing nanoparticles, called nanofluid. The nanofluids have gained a great attention du to their contibution in improving the efficiency of thermal and energy systems such as solar collectors. In this work, we conducted a numerical study of natural convection inside a rectangular enclosure filled with a mixture of water and nanoparticles. Different types of nanoparticles: silver (Ag), copper (Cu), alumina (Al2O3), titania (TiO2) and CuO are chosen for the investigation. Water is used as the base fluid with a constant Prandtl number (Pr = 6.2). Numerical computations are carried out for different Rayleigh numbers ($103 \leq Ra \leq 105$), solid volume fraction ($0\% \leq \phi \leq 20\%$) and aspect ratios ($1 \leq Ar \leq 15.5$). Analysis of isotherms, temperature profiles and, notably, the average Nusselt number show the crucial effect of the studied parameters on the enhancement of natural convection in the cavity.

Paper ID : 220_V (Distance Presentation Paper)

Title: Management and control for Photovoltaic system connected to the electrical network

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Abstract: The objective of this work is to study the performances of PV system with battery storage. It is shown that this model is interesting for analysing the dynamic behavior of the system and for synthesising the control strategy [1][2]. The control strategies of the sources are based on power, voltage and current control with Maximum Power Point Tracking (MPPT). The control system control the power generated and consumed, also the control system makes it possible to control the system of storage and to protect it against the overload and the deep discharge. The proposed energy management strategy has been simulated. Numerical results are presented and discussed, showing the effectiveness of the proposed system. The overall efficiency of a grid-connected photovoltaic power generation systems depends on the efficiency of the control system. The proposed system consists of a solar panel field, a three-phase voltage inverter connected to the grid and an inductive load.