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Technical Advisory Board

1.	**Authors:**	**Ndèye Madeleine DIOP, Boureima SEIBOU, Mamadou WADE, Marcel Sitor DIOUF, Ibrahima LY, Hawa LY DIALLO, Grégoire SISSOKO**
	Paper Title:	**Theoretical Study of Vertical Parallel Junction Silicon Solar Cell Capacitance under Modulated Polychromatic Illumination: Influence of Irradiation**

Abstract: This article is a theoretical study of vertical parallel junction silicon solar cell capacitance under modulated polychromatic illumination: influence of irradiation. Thus, from the minority carrier density and the photovoltage expressions, the capacitance is determined. Furthermore, Bode and Nyquist diagram followed by an equivalent electric circuit of the capacitance is given.

Keywords: solar cell vertical junction - frequency– Capacitance-irradiation – photovoltage - Nyquist-Bode.

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2.	**Authors:**	**Hamdy Mohamed Soliman, S.M.EL. Hakim**
	Paper Title:	**Robust PI Controllers to Improve the Dynamic Performance of PMSM with Ripple Minimization**

Abstract: Classical vector control for the permanent magnet synchronous motor (PMSM) is depending upon the mathematical model and hence any problem in the machine parameters or AC drives will deteriorate the performance of the drive system over all. So this paper suggested using four PI current controllers to improve the performance characteristics of the drive system. Three of them is used in the bang-bang control of inverter by rate of one for each phase and the other PI current controller is used to improving the q- axis current component at sudden applies or removes the load. this reflects the performance over all and improve it. The MATLAB Simulink is used to simulating the drive system. The proposed model of the vector control is compared to classical vector control to show the improvement occurs in the performance characteristics of the system with proposal method. The proposed cases are simulated through the MATLAB program and are operated in the laboratory. The laboratory results agreed with the simulating results that have been obtained

Keywords: Bang-bang inverter control, PI control, PMSM, vector control.

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3.

Authors: **Massamba DIENG, Boureima SEIBOU, Ibrahima LY, Marcel Sitor DIOUF, Mamadou WADE, Grégoire SISSOKO**

Paper Title: **Silicon Solar Cell Emitter Extended Space Charge Region Determination under Modulated Monochromatic Illumination by using Gauss's Law**

Abstract: In this paper, a method of determining the Emitter Extension space charge Region in a silicon Solar Cell Operating in short-circuit condition, is presented. The excess minority carrier's density versus base Depth is established in Dynamic Regime under monochromatic Illumination. Considering the junction as a plane capacitor, the emitter extension region X0e is determined for various wavelengths,by using Gauss's law.

Keywords: Silicon Solar Cell - minority carrier's density - monochromatic Illumination - Dynamic Regime - Gauss's Law - Emitter Extension Region

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Authors: **Mohamadou Samassa NDOYE, Boureima SEIBOU, Ibrahima LY, Marcel Sitor DIOUF, Mamadou**

		WADE, Senghane MBODJI, Grégoire SISSOKO	
	Paper Title:	**Irradiation Effect on Silicon Solar Cell Capacitance in Frequency Modulation**	
	Abstract: This paper shows the irradiation effect on a solar cell capacitance under monochromatic illumination in dynamic frequency mode. From the continuity equation, we determine the expression of excess minority carrier density from which the capacitance and the capacitance efficiency are deduced thereafter studied according to the modulation frequency and the irradiation energy. This paper shows that the capacitance efficiencyand the thickness of the space charge region (SCR)in short-circuit decrease accordingto the irradiation energy increasing. **Keywords:** Solar cell, Irradiation, frequency, capacitance efficiency. **References:** 1. Ly, O.H. Lemrabott, B. Dieng, I. Gaye, S. Gueye, M.S. Diouf And G. Sissoko, (2012) 2. Techniques de détermination des paramètres de recombinaison et le domaine de leur validité d'une photopile bifaciale au silicium polycristallin sous éclairement multi spectral constant en régime statique. 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5.	**Authors:**	**Vikram Duhan, Ritu**	
	Paper Title:	**A Hybrid Approach to Reduce Peak-to-Average Power Ratio in Single-Carrier FDMA**	
	Abstract: Single-carrier frequency division multiple access (SC-FDMA) is an improved methodology over orthogonal frequency division multiple access (OFDMA), where input information is changed from time domain to		**26-29**

frequency domain by Discrete Fourier Transform (DFT) before applying to conventional OFDMA procedure. By applying the DFT before passing it through the Inverse Discrete Fourier Transform (IDFT) it ensures that the subcarriers are orthogonal to each other which transmit signal as the single bearer signal stimulating the SC-FDMA. SC-FDMA results in reducing the Peak-to-average power ratio (PAPR) as compare to OFDMA. In this paper computational complexity of the framework is further reduced by utilizing composite of Hartley and Hilbert transformation as a part of DFT and IDFT operation. This technique improves SC-FDMA output performance measure parameters by attaining a remarkable balance between PAPR and bit error rate (BER) reduction. The simulation results depict that hybrid transformation technique have lower PAPR than Fast Fourier Transform (FFT).

Keywords: SC-FDMA, OFDMA, DFT, Hattley, Hilbert, Peak- to-Average Power, Bit Error Rate (BER)

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Authors:	**Nitin. P. Sherje, S. V. Deshmukh**
Paper Title:	**Design, Development and Performance Evaluation of Semiactive Control Device: Magnetorheological Damper**

Abstract: Vibration mitigation with semi-active control device has recently received considerable attention, because of its strong potential to control devices without imposing heavy power demands. This paper presents a design and development of Magnetorheological damper for commercial vehicles and performance evaluation experimentally. Semi-active control devices includes: Magnetorheological (MR) fluid dampers, semi-active stiffness dampers, semi-active tuned liquid column dampers, and piezoelectric dampers. In the last few years, a number of MR fluid-based devices have been researched all over the world. It has become popular in various applications like civil, automobile, biomedical, space shuttle etc. because of its advantages, high strength, Good controllability, wide dynamic range, fast response rate, low energy consumption and simple structure. Hence the work is focused on design and development of Magnetorheological damper considering the commercial vehicle and testing the performance experimentally. It has been observed that the designed damper had wide dynamic range and response. The performance of damper is tested using three different fluids MR1, MR2 and MR3. These fluids are composed by using different carrier fluids, carbonyl iron powder (5 µm) size and additives. The carrier fluids used are low viscosity paraffin oil, silicon oil, synthetic oil and additives used are AP3 Greece and Arosil.

Keywords: MR damper, magnetic potential, magnetic coil.

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Authors: **Lyudmila Aleksandrova**

Paper Title: **Passive Solar Heating and Hot Water Supply for Medical Purposes in Extreme Situations**

Abstract: In the paper are shown several ways for passive solar heating and hot water supply by using rainwater for medical purposes, demonstrated in patent BG66192 (B1) – „Solar energy application for hot water residential supply and air heating in a modular medical unit (operation theatre) in extreme situations" . Here are also explained the applications of stretched membranes as well as the use of tensegrity structures as a way of execution of protective screens for the chambers and volumes.

Keywords: passive, solar heating, hot water supply, medical purposes, extreme situations.

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5. Classification: - international: F24J2/42 - cooperative: Y02E10/40 Application number: BG20060109516 20060421
6. Priority number(s): BG20060109516 20060421
7. Also published as: BG109516 (A)
8. Aleksandrova Liudmila Chapter 5. „Connection of the walls of operation blocks with rectangular shape to the coordination axes of the carrying construction of refrigeration chambers, according to Ukrainian norms", in the monograph "Exploitation of medical modules and sub-modules in extreme situations". 2016. ISBN 978-954-331-068-5.

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8.

Authors: **Teressa Chikohora, Thulaganyo Dimakatso, Edmore Chikohora**

Paper Title: **A Technical Framework for Assessing Higher Education E-Learning Readiness**

Abstract: E-learning is one of the fast growing technologies in Higher Education which has seen institutions adopting a platform to enhance their traditional teaching, learning and assessment methods. Most institutions use already established platforms like Blackboard and Moodle, where they pay a fee for using the facility. However institutions are limited by the Service level agreements with the service providers such that they may not use other environments effectively. The study is motivated by the challenges that institutions face after investing in this e-learning infrastructure. Institutions tend to under-utilise the implemented platform yet the implementation costs are high. A thorough analysis on the technical readiness of the institution is therefore required so as to inform the decision on whether to invest or not. A survey was conducted to identify the hardware, software and networking resource requirements for an e-learning platform. Questionnaires and interviews were used as data collection instruments. The study defines a framework that may be used to assess the technical readiness of a university to implement an e-learning platform. The framework also uses the e-LRS model to inform the readiness levels. The defined framework will be useful in ensuring that universities benefit from the huge investments in e-learning infrastructure.

Keywords: e-learning, readiness, framework.

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Authors: **Pritam Singha Roy, Samik Chakraborty**

Paper Title: **Design of h-Slotted Microstrip Patch Antenna with Enhanced Bandwidth for C-Band Application**

Abstract: In this paper a compact h- shaped slotted microstrip patch antenna has been proposed for C-band applications. The antenna parameters such as Return loss, Bandwidth, Gain, VSWR are improved .The comparison between measured and simulated results for unslotted and h-slotted microstrip patch antenna has been discussed . The proposed antenna has been fabricated and tested in laboratory .The measured and simulated results are exhibits good agreement. The proposed antenna achieved 16.6% of bandwidth at centre frequency of 7.52 GHz with VSWR ≤ 2 and gain is 6.46dBi. The return loss of -27.97 dB is obtained for h-slot microstrip antenna with dielectric substrate (Glass PTFE εr =2.55) of thickness (h) =1.6 mm. The proposed antenna is simulated with IE3D® software.

Keywords: Bandwidth; Gain; h-slot;Microstrip antenna; Return loss.

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