



Proceedings of
**13th NATIONAL CONFERENCE ON
POWER ELECTRONICS AND DRIVES
(NCPED'20)**



5th March 2020



ORGANIZED BY,
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
ALAGAPPA CHETTIAR GOVERNMENT
COLLEGE OF ENGINEERING AND TECHNOLOGY
(An Autonomous Institution Affiliated to Anna University)
KARAIKUDI - 630 003.

ABOUT THE INSTITUTION

Alagappa Chettiar Government College of Engineering and Technology, Karaikudi is a distinguished college committed as a centre of Engineering Education to impart technical knowledge for excellence, motivate the learners in research, evolved result oriented innovative techniques in Engineering. It was founded by a great social reformer Dr. RM. Alagappa chettiar in 21st July 1952 with three departments - Civil, Mechanical, Electrical and Electronics Engineering. Now the college has five department with 5 UG courses and 7 PG courses. The college has been declared as the Best Engineering College of Tamilnadu for the year 2007-2008. The college receiving fund form TEQIP to develop the research activities.

ABOUT THE DEPARTMENT

The Department of Electrical and Electronics Engineering has been empowering knowledge to the student for the past sixty-seven successful year from 1952 onwards. The department is endowed with sophisticated laboratories such as Smart Grid, IOT, etc. and sufficient mentors with pedagogic skills to guide the students in the right path.

OBJECTIVE

NCPED'20 is targeted towards a platform for industrialists, researchers, professionals, academicians who would be sharing their innovative ideas, working experiences, recent trends and provide future directions in the field of Power Electronics and Devices.

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PREFACE

The Department of Electrical and Electronics Engineering, A.C Government college of Engineering and Technology, Karaikudi, Tamilnadu organizes the Thirteenth National Conference on Power Electronics and Drives (NCPED'20) on 5th March 2020. This Conference is targeted towards Researchers, Professionals, Practitioners, and educators who would be sharing their innovative ideas, working experiences, recent trends and provide future directions to Power Electronics and Drives.

A total about 41 papers were received from post and under graduates students, research scholars, faculty members, covering a wide spectrum of area, via Power Electronics and Drives Electrical Machines and Control, Special Electrical Machines, Sensor-less motor drives, Embedded systems, VLSI, Intelligent systems, Soft Computing, Control and Optimization, Wireless Control, Flexible AC Transmission systems, Power quality Improvement, Selective Harmonic Elimination. This volume is a record of current researchers in the above fields and is hoped that it will be a trigger for expanding the future researchers.

We would like to express our sincere thanks to our Principal and patron of the conference **Dr. R. Shanmugalakshmi**, Head of the Department and convener of the conference **Dr. K. Baskaran**, Organizing secretary of the conference **Dr. A. Arunya Revathi**, our beloved Faculty and staffs members for providing all support throughout the conference. We wish to express our sincere thanks to the Chief Guest **Dr. P. S. Manoharan** for being cordial and giving us scope to interact more technically. We thank the various organizations that have deputed delegates to participate in the conference. We sincerely express our thanks to various sponsoring agencies for the contribution to the conference.

EDITORS



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PRINCIPAL'S MESSAGE

I am really happy and proud that Department of Electrical and Electronics Engineering, Alagappa Chettiar Government college of Engineering and Technology is organizing National level Conference on Power Electronics and Drives (NCPED'20) during 5th March 2020. I am very confident that this conference will provide the platform for the Electrical and Electronics Engineering professionals and Research Scholars to discuss their findings and exchange their knowledge.

I wish the conference a grand success. I am sure that this conference will motivate the students for innovative works, utilize the latest equipment procured under TEQIP-III for the research and to publish paper in the reputed Journals.

**Dr. R. Shanmugalakshmi,
Principal
ACGCET,
Karaikudi-630003.**



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HOD'S MESSAGE

It is a matter of great pleasure to note that the Department of Electrical and Electronics Engineering, Alagappa Chettiar Government College of Engineering and Technology, Karaikudi organizing the National Conference on Power electronics and drives (NCPED'20) on 5th March 2020.

This conference provides exposure in bringing together the intellectuals from different walks of academics and researchers under a common platform with their pioneering ideas and thoughts towards the development in the advances of electrical and electronics engineering

It is a great achievement on the part of the organizers to arrange the publication of the Proceedings of the conference in the form of a book.

On behalf of the Department and also on my personal behalf I would like to thank the organizers of NCPED'20 for their untiring efforts and constant endeavor to make the Conference scale new heights.

I wish the conference all the very best for achieving greater success.

Dr. K. Baskaran,
Professor & Head
Dept. of EEE,
ACGCET,
Karaikudi-630003.



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ORGANIZING SECRETARY'S MESSAGE

It is my pride to write message for the “National Level Conference on Power Electronics and Drives’20 (NCPED’20) on 5th March 2020 organized by the Department of Electrical and Electronics Engineering. I am sure that technical fraternity will be highly benefited by the valuable inputs, excellent ideas and interactions for the growth of our great Nation through this Conference. I wish all the best for the success of the National Conference and my best wishes to participants.

**Dr. A. Arunya Revathi,
Associate Professor,
Dept. of EEE,
ACGCET,
Karaikudi-630003.**



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MESSAGE FROM HOD/MECHANICAL

Technical institutions are the backbones of a nation in catering to its' development. They are the centers for human resource in the field of technology and associated research. It is the responsibility of the institutions of higher studies in the field of Engineering and Technology to ensure that their students are provided with the various means of knowledge sharing and research facilities.

Students and research scholars should be provided with opportunities and platforms to be aware of the latest developments in their field of interest, to discuss and exchange their innovative ideas and to have a communicative network with their peer group. Institutions play a greater role in providing these opportunities for the learning community.

In this context I feel happy to hear that 'National Conference on Power Electronics and Drives (NCPED 2020)' is organized by the Department of Electrical and Electronics on 05th of March 2020, providing opportunity to budding scholars in the field of Power Electronics and Drives.

I congratulate the organizers and the participants on this occasion and wish the conference a grand success.

Dr. R. Malayalamurthi
Vice-Principal
Dept. of Mechanical,
ACGCET,
Karaikudi-630003.



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MESSAGE FROM HOD/ CIVIL

I am delighted to know that the Department of Electrical and Electronics Engineering of Alagappa Chettiar Government College of Engineering and Technology, Karaikudi is organizing a “NATIONAL CONFERENCE ON POWER ELECTRONICS & DRIVES” (NCPED’20) on 5th March 2020.

This kind of National Conference will be very useful to the Students, Academician and Research Scholars for updating, sharing and exhibiting their knowledge in Research in the recent trends on intelligent control, Robotics, Soft Computing and Power Electronics & Drives. I congratulate all the students, Participants, Delegates from other Colleges, Professors and Faculty members of Electrical & Electronics Engineering Department for their effort and wish this National Conference a grand Success.

**Prof. G.M. Panneerselvam,
Professor & Head
Dept. of Civil,
ACGCET,
Karaikudi-630003.**



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MESSAGE FROM HOD/ECE

Greetings!

I feel very happy to know that the Electrical and Engineering Department organizes a TEQIP sponsored National level conference on Power Electronics and Drives (NCPED'20) on 05-03-2020.

I presume that this event is targeted towards researchers, professional, educators and students to share innovative ideas, issues, recent trends and future directions in the fields of Power Electronics and Drives. I am pleased to note that researchers will be presenting their research papers on current aspects of Control Systems and Applications, Power Electronics and Drives, Electromechanical Energy Conversion, Power System Technology, Applied Technologies in Renewable Energy and Smart Grids, Recent Technological Developments in VLSI Design and Tool Automation meant for Power Systems and Technological Developments in Energy Management. I am sure that this conference would greatly benefit researchers, students and faculty. Young scientists and researchers will find the contents of the proceedings helpful to set roadmaps for their future endeavors.

I take this opportunity to wish a great success of the National Conference NCPED'20.

Dr. A. Sivanantha Raja
Professor & COE
Dept. of ECE,
ACGCET,
Karaikudi - 63003.



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MESSAGE FROM HOD/CSE

I am very glad to hear that the Department of Electrical and Electronics Engineering is organizing a National Conference on “Power Electronics and Drives (NCPED’20)” on 5th March 2020.

It is essential for professional engineers to get a platform to share and express their views in the advancement of their respective field and needs opportunity to know about the progress achieved by the engineering industry today.

As Power inevitable for human life, I hope that this conference would certainly induce innovative ideas among the participants paving way for new inventions and new technologies in the field of power Electronics and Drives and would certainly help everyone to have the latest updates to have a better understanding to contribute more to the society and progress achieved by the industry today.

Wishes to the HOD, organizers, faculty members, non-teaching staffs, and PG students of Electrical and Electronics Engineering & all the best to the participants. I wish NCPED’20 a grand success.

**Prof. K. Chandrababha,
HOD/Dept. of CSE
ACGCET,
Karaikudi-630003.**



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Dr. R. SHANMUGALAKSHMI
Principal

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Professor & Head – EEE

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National Conference on Power Electronics and Drives

NCPED'20

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(An Autonomous Institution affiliated to Anna University, Chennai)

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INDEX

S.NO	PAPER ID	TITLE OF THE PAPER	AUTHORS	PAGE NO
1	NCPED01	Breast Cancer Diagnosis using both MLO and CC view Mammogram	S. Deepthi	1
2	NCPED02	Smart Home Automation and Security system using IOT	S. Anitha	2
3	NCPED03	Fruit Maturity and Disease Detection using ANN Technique	S. Deepika	3
4	NCPED04	ATM Theft Detection and Prevention using IOT	M. Sugapriya	4
5	NCPED05	Alternate Charging of Electric Vehicle using Solar Apprehends System with Dual Battery Management	Dr. S.M. Kannan D. Bill Jousha Swamidoss M.A. Mohammed Ismail M. Mohan Kumar M. Akash	5
6	NCPED06	Home Automation using IOT for Energy Conservation	S. Manoharan M. Karthick R. Lakshmanan E. Arun	6
7	NCPED07	IOT Based Dual Axis Solar Tracking System for Electric Vehicle	Dr.S. Venkatesan R.S. Karthick A. Mutheeswaran M.S. Amrith	7
8	NCPED08	Auto Synchronization of 210MW Generator to Grid using Controller	M. Jeyamurugan B. ManikandanPrabhu, G.V. AnujAldrine R. Abilash	8
9	NCPED09	Designing and Analysis of Grid connected Inverter with Harmonic Suppression	G. Ramya K. Padmanaban	9
10	NCPED10	An Enhanced Concoction of Multilevel Cascaded Dc-Dc Boost Converter	A.P. AyishaBanu M. Marimuthu	10
11	NCPED11	Design and Implementation of Central Source Multilevel Boost Converter	M. Gomathi M. Marimuthu	11



ALAGAPPA CHETTIAR GOVERNMENT COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution affiliated to Anna University, Chennai)

Karaikudi-630 003.



12	NCPED12	Efficient Buck-Boost Converter using Interleaved Topology	A. Srimathi S. Vijayalakshmi	12
13	NCPED13	Single Phase Multilevel Inverter based on a Novel Switching scheme using Buck Converter	N. Sudharsan B. Paranthagan	13
14	NCPED14	Analysis of MMC with Standalone PV System	B. Lavanya S. Balamurugan	14
15	NCPED15	Design and Simulation of Solar Powered MPPT Control for AC Off Grid	S. Kiruthiga P. Ramesh Babu	15
16	NCPED16	Solar PV-Powered Electric Vehicle with BLDC drive for adjustable Energy Management	K. Vigneshwari ML. Ramamoorthy	16
17	NCPED17	Involuntary Power Meter Lectura System	D.K. Karthick A. Aravind N.S. Kowshik A. KadharMydeen A. Manoj	17
18	NCPED18	Design of DVR to Mitigate short distance disturbances on a Three Phase System.	S. Kamalakannan Dr. M.V. Suganyadevi	18
19	NCPED19	Power Management Control Strategy for Renewable Energy based DC Micro-grid with Load Shedding Algorithm.	B. Prabhakaran Dr. L. Jessi SahayaShanthi	19
20	NCPED20	Enhancement of Power Quality using Solar PV Integrated UPGC	S. Janakiraman V. Suresh Kumar	20
21	NCPED21	Implementation of Fuzzy Logic based MPPT for Solar PV System	T. Shalini G. Amuthan S. Venkatesan	21
22	NCPED22	Machine to Machine Communication using Wi-Fi Module	Dr. A. Arunyarevathi R. Anusuya	22
23	NCPED23	Estimation of PV Module Parameters at Standard Test Conditions	R. Gowsalya Dr. M. Balasubramonian	23
24	NCPED24	Interleaved Cuk Converter based EV Battery Charger using PID Controller	G. Harini K. Ramadas	24
25	NCPED25	Analysis of Control Schemes for Doubly Fed Induction Generator based Wind Turbine	B. Garkki V. Pradeep	25
26	NCPED26	Grid Connected PV Inverter based on Modular Multilevel Converter with Fuzzy Logic Controller	N. Vivedha C. Vennila	26



ALAGAPPA CHETTIAR GOVERNMENT COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution affiliated to Anna University, Chennai)

Karaikudi-630 003.



27	NCPED27	Solar PV based Heric Inverter for Standalone System	S. Ida Evangeline N. Maheswari	27
28	NCPED28	Design of Dc-Dc Z-Source Converter applied to PV Panel by using FLC System	M. Thenmozhi P. Madasamy	28
29	NCPED29	Demand-Side Management analysis in Power Distribution Network: A Case Study	S. Ayyanar R. Dharani Dr. S. Venkatesan Dr. M. Balasubramonian	29
30	NCPED30	Integration of Solar PV into Distribution Network	S. Sivakumar S. Aasaimani	30
31	NCPED31	State of Charge Estimation of Lithium Ion Battery in Electric Vehicle using Extended Kalman Filter	Dr.S.Nageswari S.Loganayaki	31
32	NCPED32	Smart Micro-Grid System with Wind/PV/Battery	K. Ajithkumar Dr. M. Arun	32
33	NCPED33	Design and Implementation of Automation System on Smart LV Grid	B. Lakshmiprabha	33
34	NCPED34	Controlling the Voltage Fluctuations in Hybrid System using DVR	M. Thandayuthapani K. Thirumal	34
35	NCPED35	Applications of Liquid Crystal	D. Rajeswari Dr. A. ArunyaRevathi.	35
36	NCPED36	Optimal sizing of Hybrid Renewable Energy System	R. Srinivasa Dr. D. Nelson Jayakumar	36
37	NCPED37	Closed-Loop Attitude Control System using Rate Gyroscopes for Flight Vehicles	S. Ellakia S. Pavithradevi P. Poornamathi V. Varsha N. Arulmozhi	37
38	NCPED38	Multi source switched Capacitor Based Boost H-Bridge Converter for renewable energy Based Systems	Hariharan.S, Santhosh.S, Santhosh.N, Sadeeshraj.G, R.Karthikeyan	38
39	NCPED39	Implementation of vehicle to vehicle horn system using RF technology	S.Atchayabalan, K.Vasudevan, V.Murgan, M.Kavidasan, N.Meenakshi,	39



ALAGAPPA CHETTIAR GOVERNMENT COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution affiliated to Anna University, Chennai)

Karaikudi-630 003.



40	NCPED40	Electric Vehicle Charging Station with 2way source with power management and station maintenance	L.Swathi, G.Karthikeyan	40
41	NCPED41	Search engine process review	Rasikannan.L, Subhashri.MS, Agilandeswari.RM	41



**Proceedings of the Thirteenth National Conference on
Power Electronics and Drives, NCPED'20, 5th March 2020**



**NCPED01- BREAST CANCER DIAGNOSIS USING BOTH MLO AND CC
VIEW MAMMOGRAM**

S. Deepthi

PG Scholar

Department of ECE

Bharathiyar Institute of Engineering for women

Deviyakurichi, Attur

Abstract- Breast cancer is one of the abnormality and most common form of cancer found among women. Segmenting the cancerous part from mammogram is an important step for breast cancer analysis. K means clustering is one of the popular methods because of its simplicity and computational efficiency. Fuzzy C means algorithm has additional flexibility for the pixels to belong to multiple classes with varying degrees of membership. The performance of these two clustering methods has been analyzed for the segmentation of suspicious regions from mammogram images by using various evaluation metrics such as Peak Signal to Noise Ratio, Mean Square Error, Mean Absolute Error and Entropy. The performance of the algorithms is exhaustively analysed for DDSM (Digital Database for Screening Mammograms) data base. The results show that fuzzy c means clustering provides better performance in mammogram segmentation. Further feature extraction is done using Gray level Difference Method (GLDM) and classified using Back Propagation Network. The performance measures of accuracy, specificity and sensitivity of the benign and malignant cases of MLO and CC views are calculated effectively. The performance measures were calculated individually for MLO and CC cases and they are compared with the combining both the views. This project well proves that the accuracy of the data sets is improved when both the views are combined together.



**Proceedings of the Thirteenth National Conference on
Power Electronics and Drives, NCPED'20, 5th March 2020**



NCPED02- SMART HOME AUTOMATION AND SECURITY SYSTEM USING IOT

S. Anitha

PG Scholar

Department of ECE

Bharathiyar Institute of Engineering for women

Deviyakurichi, Attur

Abstract - With the advancement of technology and more dependency of people on smart phone and increasing demands of easy and quick way of solving daily life task, it has become very important to have a technology which can control over the domestic and industrial applications using IOT. Home automation refers to the automated and electronic control of household appliances, features and activities. At present Android mobile is extremely common and really important part of our life. So, this project is completed in such a way, how we will control and monitor our home through one device. Home security is a very useful application of IoT and we are using it to create an inexpensive security system for homes as well as industrial use. The system will inform the owner about any unauthorized entry or whenever the door is opened, it's by sending a notification to the user. After the user gets the notification, he can take the necessary actions. The security system will use a microcontroller known as Arduino Uno to interface between the components, a PIR sensor to detect any motion, a buzzer for sounding the alarm, a Wi-Fi module ESP8266 and IP camera used for remote monitoring to connect and communicate using the Internet. All these data can be seen by user on the cloud platform like BLYNK APPLICATION. It means if any operations we would like to form any devices on/off we will control through that Android App. This technique requires minimum human intervention to regulate the system. It ensures the security of home from unwanted occurrence and theft. This paper 'Sensing and controlling the world around using Arduino and IOT deals with embedded technologies along with Internet of things (IOT).



**NCPED03- FRUIT MATURITY AND DISEASE DETECTION USING ANN
TECHNIQUE**

S. Deepika

PG Scholar

Department of ECE

Bharathiyar Institute of Engineering for women

Deviyakurichi, Attur

Abstract— Crops are being affected by uneven climatic conditions leading to decreased agricultural yield. This affects global agricultural economy. Moreover, condition becomes even worst when the crops are infected by any disease. Also, increasing population burdens farmers to increase yield. This is where modern agricultural techniques and systems are needed to detect and prevent the crops from being affected by different diseases. The image processing and computer vision based systems have been widely used for identification, classification, grading and quality evaluation in the agriculture area. Defect identification and maturity detection of fruits are challenging task for the computer vision to achieve near human levels of recognition. The objective of this work is to develop an automated tool, which can be capable of identifying defect and detect maturity of fruits based on shape, size and color features by digital image analysis. In this method it uses k-means clustering algorithm for training data set and features are extracted using GLCM matrix and selected features are given to classifier the classifier used here is Artificial Neural Network. MATLAB have been used as the programming tool for identification and classification of fruits using Image Processing toolbox. Proposed method can be used to detect the visible defects, stems, size and shape of fruits, and to grade the fruits in high speed and precision.



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NCPED04- ATM THEFT DETECTION AND PREVENTION USING IOT

M. Sugapriya

PG Scholar

Department of ECE

Bharathiyar Institute of Engineering for women

Deviyakurichi, Attur

Abstract- In the era of digitalization, everyone needs money without interaction with bank at any time. So the ATM (Automotive Teller Machines) are installed everywhere in the localities. As the number of ATMs increased, prevention of theft and security of customer is the prime objective. At present, security systems are not highly secured as they are only provided with alarm system. This project deals with design and implementation of ATM security system using ARDUINO. The prime objective of this project is, to secure the ATM system using IOT and vibration sensor. In this project, when a thief enters and tried to harm the machine, the vibration sensor which is attached to the machine get vibrated and sends the signal to the ARDUINO microcontroller. Once the controller receives signal, it locks the door of ATM room by sending signal to the dc motor and sprinkler sprinkles the chloroform to make the thief unconscious. The buzzer will also be getting activated at the same time to alert the nearby people of ATM system. Simultaneously, the controller will send a message to an authorized person of the bank through IOT modem and the door is made to open only after entering the password by the bank staff.



**Proceedings of the Thirteenth National Conference on
Power Electronics and Drives, NCPED'20, 5th March 2020**



**NCPED05- ALTERNATE CHARGING OF ELECTRIC VEHICLE USING SOLAR
APPREHENDS SYSTEM WITH DUAL BATTERY MANAGEMENT**

D. Bill Jousha Swamidoss, M.A. Mohammed

Ismail, M. Mohan Kumar, M. Akash

U.G Student

Department of EEE

K.L.N College of Engineering

Pottapalayam, Sivagangai

Dr. S.M. Kannan

Professor/HOD

Department of EEE

K.L.N College of Engineering

Pottapalayam, Sivagangai

Abstract-In order to reach significant CO₂ emissions reductions, future energy systems should require a large share of renewable energies, such as solar photovoltaic power. However, relying on such renewable energy sources is expected to generate considerable excess power during certain periods of the day, in particular during daytime for solar power. In order to utilize the solar power in electrical vehicle with a efficient manner our proposal will plays a major role. The normal electrical vehicle consists of a stalk of battery with a battery management system to run the motor of the vehicle. The main drawback of the electrical vehicle is charging. Developing country like India will takes a longer time to implement the more charging station due to the population density. In such countries during some emergency conditions like the battery of the vehicle is drained and the vehicle is far away from charging station. In such out of fuel condition in Internal Combustion engine vehicle it is easy to buy and carry a fuel but in battery drained condition of electrical vehicle is result in the idealess condition of the customer. Hence our proposal will overcome that condition and cover the maximum distance to reach the charging stations.



**Proceedings of the Thirteenth National Conference on
Power Electronics and Drives, NCPED'20, 5th March 2020**



NCPED06- HOME AUTOMATION USING IOT FOR ENERGY CONSERVATION

M. Karthick, R. Lakshmanan, E. Arun

UG Student

Department of EEE

K.L.N. College of Engineering

Pottapalayam, Sivagangai

S. Manoharan

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Abstract- Nowadays smart home, smart meters with Internet of Things have been massively developed in modern days to replace traditional analogue meters. It automatically collects and receives data within short period of time. This system integrates various machine learning models into a single forecast system for predicting the power consumption. This project can prove the security of smart homes successfully. In this project we can control the device in online monitoring system. Alternatively when the shutdown from electric board, we can produce power from solar. This paper presents the complete design of an IoT based sensing and monitoring system for smart home automation using solar power. Solar power has been interfaced with microcontroller and other house hold appliances. Every electrical device can be monitored and controlled by the consumer with single tap on mobile phone and loss of energy can be minimized, hence an smart control unit has been constructed with less energy usage.



**Proceedings of the Thirteenth National Conference on
Power Electronics and Drives, NCPED'20, 5th March 2020**



**NCPED07- IOT BASED DUAL AXIS SOLAR TRACKING SYSTEM FOR ELECTRIC
VEHICLE**

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Abstract - In the field of renewable energy, solar energy is the main concern and utilization of solar energy is increasing every day. Solar energy is rapidly gaining disrepute as an important means to expanding renewable energy source. It offers the considerable energy potential compared with other currently available renewable resources. Usage of solar energy requires more research and development and new techniques to improve the efficiency of solar applications but the efficiency of current systems already make solar harvesting a viable commercial option. For the proper utilization of solar energy from the sun technology advancement is the vital concern. In this project the design and construction of a microcontroller-based solar panel tracking system is included that allows more energy to be produced because the solar panel will be able to always align to the sun so that it can be able to generate more energy than a fixed Solar panel. To conduct the project work we have used Arduino board and Arduino IDE software. Components are connected to the Arduino for our desired works through command codes installed in its microcontroller. LDR has been used to sense the photon and Servo motors to rotate the solar panel depending on the position of the sun daily and seasonally. The system has to be made fully automatic through a driving program which has been developed using Arduino IDE and burnt into the microcontroller of the Arduino board. The entire system has been developed and tested in our laboratory and found it working satisfactorily with desired accuracy.



**Proceedings of the Thirteenth National Conference on
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**NCPED08- AUTO SYNCHRONIZATION OF 210MW GENERATOR TO GRID USING
CONTROLLER**

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Abstract- An AC generator cannot deliver power to an electrical grid, unless it is running at the same frequency as compared to the network frequency. In an AC electric power system, synchronization is the process of matching the speed and frequency of a generator or other source to a running network. An AC generator must match both the amplitude and timing of the network voltage, which requires both speed and excitation to be systematically controlled for synchronization. In the existing system synchroscope is used to indicate whether the incoming generator is faster/slower or in –phase With the bus. When the needle in the synchroscope reaches 12'o clock position, circuit breaker closes manually synchronization. Now-a-days the voltage, frequencies, phase sequences and synchronism time date has been transferred to the micro-controller .These data are monitored and evaluated by the control algorithm which are coded into the microcontroller.

The system doesn't requires any additional measuring tools for monitoring and control processing. The developed automatic synchronization unit is fast, cost effective, reliable and precise to be used for monitoring, measuring, and also for parallel operation of the synchronous generator to grid. Faulty synchronization can damage the electrical and mechanical generating system, which can cause disturbance to the power system until to trip offline. Therefore, auto synchronization is used to achieve greater precision and accuracy, so it can be implemented by using controller.



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NCPED09- DESIGNING AND ANALYSIS OF GRID CONNECTED INVERTER WITH HARMONIC SUPPRESSION

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Abstract- The increased trend in using the renewable energy instead of fossil fuel based generation due to its low environmental impact and to facilitate the increased consumption has led to extensive use of distributed generation. The use of power electronics with renewable energy offers wide advantages including greater controllability of generated power and fulfilling the requirements for grid connected systems. The interface of renewable energy consists mainly of the Voltage Source inverter therefore its control is an important factor as its output should be completely synchronized with grid. In this paper the synchronization of grid connected voltage source inverter and control of injected current to ensure unity power factor at point of common coupling (PCC) is discussed. Phase locked loop is used to extract grid angle and to lock synchronous rotating dq reference frame with grid voltage in terms of frequency and phase thus making the control parameters as dc values. The current control strategy is Voltage oriented Control (VOC) implemented in synchronous rotating dq frame to control active and reactive power independently by controlling currents in d and q axis respectively. The simulation of system is done in Matlab/ Simulink environment. The simulation result of SPWM controlled converter and proposed DQ controlled inverter is compared in terms of THD.



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**NCPED10- AN ENHANCED CONCOCTION OF MULTILEVEL CASCADED DC-DC
BOOST CONVERTER**

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Abstract- This paper put forward an enhanced Multilevel Cascaded DC-DC boost converter to harvest a high voltage gain for applications which are backing by renewable sources. The non-conventional source like PV yield low output voltage. This bring the researchers direct attention on converters to efficient it for high voltage gain. Herein, a Multilevel Cascaded boost converter is schemed for a quick fix. This conjoins the basic Cascaded boost converter and a multilevel boost converter to entrust high voltage gain. The proposed scheme build up with Cascaded boost converter and voltage multiplier cell which perform as a gain extension cell. The intention of this paper is to proffer a converter which has low current stress and high voltage gain when compared with available non-isolated converters for PV requisition. And also this paper manages the machination and persistent state investigation of the proposed converter and the mimeograph have been performed exploiting MATLAB/Simulink.



**Proceedings of the Thirteenth National Conference on
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**NCPED11- DESIGN AND IMPLEMENTATION OF CENTRAL SOURCE
MULTILEVEL BOOST CONVERTER**

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Abstract- This paper proposes the central source multi level boost converter (CMBC). The presented central source multilevel boost converter topology consists of traditional boost converter and voltage double stages to provide different output voltages, $2N-1$ diodes and $2N-1$ capacitors for obtaining an output voltage which is N times the conventional boost converter. A seven level central source multi level boost converter is designed and simulated in this paper. In this topology each device obstructs only one voltage level, accomplishing high voltage converter with low voltage devices. Uninterrupted input current and large gain without enormous duty cycle and without transformer allowing high switching frequency are the major advantages of this topology. The main advantage of this converter are large voltage gain without large duty cycle, continuous input current and use of devices with low voltage ratings.



**NCPED12- EFFICIENT BUCK-BOOST CONVERTER USING INTERLEAVED
TOPOLOGY**

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Abstract- A DC to DC converter is of great importance in the field of sustainable energy. This paper deals with the Buck-Boost converter where the output DC voltage can be higher value (step up) or lower value (step down) than the input DC voltage. But due to various switching losses, conduction losses across the passive elements, the efficiency reduces which worsen the converter performance. Thus to avoid these disadvantages a Interleaved topology is employed, where two buck-boost converters operate in collateral which reduces the switching stress and reduces the ripple content of the input current as the MOSFET's operate 180° out of phase. This paper scrutinizes the efficiency and the output voltages of both Buck-Boost and Interleaved Buck-Boost converter.



**Proceedings of the Thirteenth National Conference on
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**NCPED13- SINGLE PHASE MULTILEVEL INVERTER BASED ON A NOVEARAJL
SWITCHING SCHEME USING BUCK CONVERTER**

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Abstract-This paper presents a single phase multilevel inverter (MLI) based on a novel switching scheme. This new idea produces a suggestive reduction in the number of power devices and capacitor required to implement multilevel output with battery powered application. The proposed scheme has two stages namely, DC-DC converter and Inverter. Multilevel are achieved for the inverter by altering duty cycle of the DC-DC converter. The proposed idea has been implemented in the MATLAB/SIMULINK environment and the results have been validated.



**Proceedings of the Thirteenth National Conference on
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NCPED14- ANALYSIS OF MMC WITH STANDALONE PV SYSTEM

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Abstract- The Modular Multilevel converter (MMC) is rapidly evolving and highly inevitable Multilevel Converter topology for medium and high voltage applications. The MMC profoundly adapted for power conditioning in renewable energy sources applications like solar Photovoltaic and Wind energy systems. The solar PV system is one of the most promising technologies of renewable energy sources in electric power generation. The main features of Solar PV system are eco-friendly, pollution free and inexhaustible. The vital detriment of the solar PV system is low efficiency. Over the decade year, several kinds of research are conducted in power electronics interface devices to improve the performance solar PV system. This paper presents a model of a three-phase MMC with half bridge cell configuration in the state space approach using differential equations which precisely describe the dynamic characteristics of the converter. Also, the simulation of a stand-alone PV system with this MMC model in MATLAB m-script file is presented. Finally, the simulation results validate the effectiveness of the converter with low Total Harmonic Distortion (THD) output voltage.



**Proceedings of the Thirteenth National Conference on
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**NCPED15- DESIGN AND SIMULATION OF SOLAR POWERED MPPT CONTROL
FOR AC OFF GRID**

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Abstract- In this paper, a boost converter is employed for the control of photovoltaic power using Maximum Power Point Tracker (MPPT) control mechanism. The MPPT is used for extracting the utmost possible power from the PV array and fed to the load via boost converter which steps up the voltage to required magnitude. The converters are designed such the boost converter provides an output voltage of 350V DC from 150V PV array and therefore the single phase SPWM inverter provides 350V, pure wave output (230V RMS) applicable to AC off-grid. The designed boost converter is used to run a single-phase full- bridge inverter. The circuit is simulated using the MATLAB/ Simulink software. The simulation results of designed boost converter is shown which are designed to exchange transformers from conventional inverter circuit to make low-THD, highly efficient and compact transformer-less inverter topology.



**Proceedings of the Thirteenth National Conference on
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**NCPED16- SOLAR PV-POWERED ELECTRIC VEHICLE WITH BLDC DRIVE FOR
ADJUSTABLE ENERGY MANAGEMENT**

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Abstract- Electric vehicles (EVs) offer a possible way out to reduce a emission of green house. Consecutively to expand the EVs' miles of driving, the reliance on vehicle batteries can be reduced by using the Photovoltaic (PV) panels on the vehicle. Brushless DC Motors (BLDC) are one of promised motors for EV applications. A tri-port converter is proposed to control the energy flow between the PV panel, battery and BLDC. The effectiveness of the proposed tri-port converter can be proved by the simulation result of Matlab /Simulink experiments. Therefore to increase the driving distance of EVs and to reduce the system price, the BLDC and PV panel are proposed. The most important aid of this paper are the PV panel, battery and BLDC can be coordinated by using tri-port convertor. To attain a flexible flow of energy for control of driving, hybrid control of charging, six operational modes are developed. Therefore without the need of any external power devices, the method of grid charging is formed. To improve the utilization of solar energy the scheme known as the PV-fed battery charging control scheme is used.



**Proceedings of the Thirteenth National Conference on
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NCPED17- INVOLUNTARY POWER METER LECTURA SYSTEM

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Abstract- The present system of energy metering as well as billing in India which uses electromechanical and somewhere digital energy meter is error prone and it consumes more time and labor. As an alternative, in our proposed project, we used Digital energy metering system developed with Arduino, Wi-Fi Launch pad and necessary software. This will automatically read the energy meter data and sends it to the customer and service provider on reception of a specific message from service provider. So this project reduces the man power and errors during billing. The system can also provide the facility to disconnect the supply of a customer in case of any payment related issue and also if the amount falls below certain amount and send a SMS to the customer. It also notifies the customers if the amount falls below 50%,75%and 90% through SMS using GSM module. User can also disconnect their heavy loads or light loads using customer mobile phones. The loads are separated and disconnected using the four channel or eight channel relay. The usage and current status of the customer amount is displayed on the LCD display which is placed near the Digital meter.



**Proceedings of the Thirteenth National Conference on
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**NCPED18- DESIGN OF DVR TO MITIGATE SHORT DISTANCE DISTURBANCES
ON A THREE PHASE SYSTEM**

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Abstract- Power Quality is one of the major considerations in all electrical appliances every consumer requires reliable and good power quality supply. Voltage sag is a undesirable power quality glitch and is common in distribution system which causes sensitive power quality issues. DVR is a custom power device used to overcome voltage sags and swells that occur in electrical power distribution by injecting voltage as well as reactive power into the system. This paper shows the hardware implementation of three phase DVR to mitigate voltage sag for a three-phase power quality system. Here DVR is implemented to test large scale laboratory equipment with a rating of 5kw power. This works includes a fuzzy logic controller (FLC) which improves the system efficiency, reliability and reduces the voltage sags swells developed in a system as compared to the PI controller.



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NCPED19- POWER MANAGEMENT CONTROL STRATEGY FOR RENEWABLE ENERGY BASED DC MICRO-GRID WITH LOAD SHEDDING ALGORITHM

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Abstract- Micro-grid power generations are mostly based on Renewable Energy resources such as solar PV, Wind energy, tidal, biomass and Hydro etc., The De-centralized AC Micro-grid produces conversion losses such as conduction and switching losses when subjected to AC-DC-AC conversion scheme. Usually, DC loads are supplied by using AC to DC converters when connected to AC source in conventional AC micro-grid. So, enormous power is lost during this multiple conversion process. Solar PV system generates DC power whereas it is inverted using converters in the conventional AC micro-grid system. Wind energy is drastically intermittent by nature hence; it faces lot of issues when connected to AC grid. If a wind turbine is disconnected from the grid it takes minimum 20 mins to resynchronize with the AC power grid. Wind power output cannot be connected to grid directly instead AC-DC-AC is employed in conventional AC micro-grid system. To meet out these mentioned issues and to improve the efficiency of the Micro-grid system under grid connected and islanded operations, a DC micro-grid is proposed with power management control strategy and priority-based load shedding algorithm. DC micro-grid involves renewable based Solar PV generation, Fuel cell and Battery energy storage system. A power management control strategy is established through coordinating the control operations of fuel cell and Battery energy storage system. A dedicated control algorithm is developed based on comparison of DC link voltage and battery SOC, along with difference between load current demand, generation current and battery current to coordinate the fuel cell, Battery with the DC micro-grid. It provides duty signals to the power interfacing converters so that it will maintain constant dc link voltage for a varying load and intermittent conditions of renewable energy. And, finally a priority-based load shedding algorithm is established which connects the loads with DC micro-grid on priority and manageable basis. The SPWM based bi-directional converter is simulated and it kept the DC micro-grid synchronized with utility. The performance evaluations of the Energy storage devices according to the renewable generation and loading conditions are investigated and the Simulink results are shown for a grid connected and islanded mode of operations in MATLAB/SIMULINK environment.



**NCPED20- ENHANCEMENT OF POWER QUALITY USING SOLAR PV
INTEGRATED UPQC**

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Abstract- This paper deals with an enhancement of power quality using a three-phase single stage solar Photo Voltaic integrated Unified Power Quality Conditioner (PV-UPQC). The PV-UPQC consists of shunt and series compensators connected back-to-back with common dc-link. The series compensator compensates for the grid side power quality such as voltage sag/swell, voltage interruption. The compensator injects the required voltage in phase with the Point of Common Coupling (PCC) during short duration voltage variations such as sag/swell and interruption respectively. The shunt compensator performs dual functions of extracting power from PV array and compensating load current harmonics. The Synchronous Reference Frame (SRF) theory of control is used for control of both compensators. Maximum Power Point Tracking (MPPT) algorithm generates the reference voltage for the dc-link of PV-UPQC. In this work, Perturb and Observe (P&O) algorithm and Incremental Conductance (IC) algorithm are used separately and checked the performance of both algorithms with varying irradiances and temperatures. The proposed system combines the both benefit of renewable energy along with improving power quality. The performance of the proposed system is analyzed by simulating in MATLAB/ Simulink under a three-phase bridge rectifier with RL load.



**Proceedings of the Thirteenth National Conference on
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**NCPED21- IMPLEMENTATION OF FUZZY LOGIC BASED MPPT FOR SOLAR PV
SYSTEM**

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Abstract- Solar Photo Voltaic (PV) Energy is one of the promising renewable energy sources. The problem with PV energy utilization is its poor efficiency. Hence efficient utilization of PV energy relies on the successful implementation of Maximum Power Point Tracking (MPPT). In this paper a detailed explanation of a Fuzzy based implementation of maximum power point tracking is presented. A 200W PV panel is taken for study. The input for Fuzzy controller are change in PV power ΔP and change in PV voltage ΔV and the output from Fuzzy controller is change in duty cycle ΔD . Inference table is formed based on PV characteristics of the panel. Mamdani fuzzy model with Max- Min composition is used. Fuzzy is implemented using PIC18F452 microcontroller, the results obtained are compared with results from rule viewer of Fuzzy Logic tool box in MATLAB simulation tool.



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NCPED22- MACHINE TO MACHINE COMMUNICATION USING WIFI MODULE

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Abstract- Machine-to-Machine (M2M) communication is a form of data communication that involves one or more entities that do not necessarily require human interaction or intervention in the process of communication. M2M is also named as machine type communication (MTC). In this project Machine to machine (commonly abbreviated as M2M) refers to direct communication between devices using any communications channel, including wired and wireless. Machine to Machine communication can include industrial instrumentation ,enabling a sensor or meter to communicate the data it records (such as temperature, inventory level, etc.) to application software that can use it (for example , adjusting an industrial process based on temperature or placing orders to replenish inventory) Such communication was originally accomplished by having a remote network of machines relay information back to a central hub for analysis, which would then be rerouted into a system like a personal computer.



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NCPED23-ESTIMATION OF PV MODULE PARAMETERS AT STANDARD TEST
CONDITIONS

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Abstract- The objective of this paper is to estimate the values of single diode model parameters of PV module such as shunt resistance (R_{sh}), series resistance (R_{se}), diode thermal voltage (V_t) and from these values ideality factor (A), diode reverse saturation current (I_{sat}), light generated current (I_{Lg}) are estimated using Newton Raphson method under Standard Test Conditions (Irradiance, $G=1000W/m^2$, Temperature, $T=25^\circ C$). Suitable equations are formed, by which the values of the series and shunt resistances are estimated by the proposed Generalized Hopfield Neural Network method with suitable initial conditions. The parameters of shunt resistance (R_{sh}), series resistance (R_{se}), and diode thermal voltage (V_t) of a 80W PV module are estimated using Newton Raphson method, equivalent C-code and proposed GHNN method. The results obtained from Newton Raphson method, equivalent C-code and the GHNN method are tabulated. From the table, it is inferred that all the three method gives the same result. The equivalent C-code was developed such that it can be implemented in real time systems.



**Proceedings of the Thirteenth National Conference on
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**NCPED24- INTERLEAVED CUK CONVERTER BASED EV BATTERY CHARGER
USING PID CONTROLLER**

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Abstract- An electric vehicle battery charger with interleaved (IL) Cuk converter followed by a fly-back converter is presented in this thesis. The proposed configuration of Converter is obtained by interleaving two Cuk converter. The interleaving of the two Cuk Converter, offers the increased reliability of the proposed charger at high power rating due to reduced input current and output voltage ripple. The design of IL Cuk converter and fly-back converter, is achieved in discontinuous conduction mode (DICM). This provides the built-in advantages of zero current switching and no reverse recovery losses in diodes. Moreover, the size of the inductors and number of sensor, are reduced due to DCM operation of the converter. The proposed charger is designed to control the charging of battery in CC (Constant Current) and CV (Constant Voltage) modes.



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**NCPED25- ANALYSIS OF CONTROL SCHEMES FOR DOUBLY FED INDUCTION
GENERATOR BASED WIND TURBINE**

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Abstract-This paper presents the analysis of control schemes on DFIG based wind turbines. Where the stator is directly connected to the grid and the rotor is connected to the grid through the back to back AC-DC-AC converters. This paper deals with modeling of DFIG wind turbines and studies the operation and control of DFIG based wind turbines. To reduce the complexity problems, the whole model is considered as a collection of subsystems which are modeled individually and then assembled to get wind turbine model. PWM control method is implemented for decoupled control of active and reactive power. To analyze the transient response of DFIG using direct rotor current mode control for Rotor side Converter. The complete system is modeled and implemented in the control system simulation tool MATLAB/ Simulink and model verification is done to control the real and reactive power control.



**NCPED26- GRID CONNECTED PV INVERTER BASED ON MODULAR
MULTILEVEL CONVERTER WITH FUZZY LOGIC CONTROLLER**

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Abstract- The control and modelling of modular multilevel converter (MMC) with grid-connected photovoltaic system comparing the analysis with fuzzy logic based on MPPT for tracking maximum power from photovoltaic modules. The mathematical modelling and simulation of photovoltaic energy is implemented in the MATLAB/SIMULINK are tested and validated. In this project, the fuzzy logic tuned PI controller is designed and implemented to overcome this problem. The fuzzy logic controller strain the controller gain based on the operating point of the system. The improved performance parameters such as faster transient response, tracking of the reference current with low overshoot and short settling time with system parameter changes under partial shading of the proposed controller are validated.



**Proceedings of the Thirteenth National Conference on
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NCPED27- SOLAR PV BASED HERIC INVERTER FOR STANDALONE SYSTEM

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Abstract- Photovoltaic inverters have a very important role in energy market, they must possess excellent characteristics regarding efficiency, cost and power losses. The PV structure most often used transformer-based inverter which includes galvanic isolation but on the other hand reduces overall efficiency. In this paper a transformerless HERIC inverter for standalone load utilizing solar PV is proposed. A dc-dc SEPIC converter topology is designed to regulate the output voltage of Solar PV array. To optimize the output of the solar PV system, Perturb and Observe maximum power point tracking algorithm is provided. Unlike the other transformerless inverter topologies like H5, H6, neutral point clamped (NPC) and full H-bridge, HERIC inverter comprises low leakage current. The performance indices like total harmonic distortion (THD) of the proposed system is observed. The entire proposed system along with comprehensive simulation results that discovers the feasibility of the system is described in this paper.



**Proceedings of the Thirteenth National Conference on
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**NCPED28- DESIGN OF DC-DC Z-SOURCE CONVERTER APPLIED TO PV PANEL
BY USING FLC SYSTEM**

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Abstract- This paper is to estimate the z source DC-DC converter operating in continuous conduction mode (CCM). The Z- source converter is recently premised which can perform both buck and boost operation provide high range of DC output voltage, reduce in-rush and ripple currents. A photovoltaic (PV) array output is connected to the input of ZSC and it provides voltage gain from 75V. The input power of solar panel arrangement was 1440 W. Compared to other conventional DC-DC converters, the ZSC will give better performance. Here the maximum power point tracking (MPPT) is achieved by controlling the duty cycle of the converter. To develop in this work by using a fuzzy logic control based Maximum power point tracking (MPPT) and also to track the maximum power point of the PV array under variable solar intensity and solar temperature conditions. Simulation results of dc-dc z- source converter has been achieved in MATLAB software.



**Proceedings of the Thirteenth National Conference on
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**NCPED29- DEMAND-SIDE MANAGEMENT ANALYSIS IN POWER DISTRIBUTION
NETWORK: A CASE STUDY**

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Abstract -Demand Side Management (DSM) is a portfolio of measures to improve the energy system at the side of power consumption. It ranges from improving energy efficiency by using better materials, over smart energy tariffs with incentives for certain consumption patterns, up to sophisticated real-time control of distributed energy resources. This paper gives DSM analysis for ACGCET Campus using Load shifting Technique. The load data for the site is taken and simulated using HOMER simulation tool. The results reveals that there is a considerable reduction in Maximum Demand Energy which leads to reduce demand charges in the Tamil Nadu Generation and Distribution Corporation Limited bill.



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NCPED30- INTEGRATION OF SOLAR PV INTO DISTRIBUTION NETWORK

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Abstract- Rapid growth of distributed energy resources has prompted increasing interest in integrated Transmission (T) and Distribution (D) modeling. This paper presents the results of a distributed generation from solar photo voltaic (DGPV) impact assessment study that was performed using a synthetic T&D model. The primary objective of the study was to present a new approach for DGPV impact assessment, where along with detailed models of transmission and distribution networks, consumer loads were modeled using the physics of end-use equipment, and DGPV was geographically (ii) how capturing transmission voltage changes using integrated T&D can change simulated distribution voltage profiles and voltage regulator operations.



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**NCPED31- STATE OF CHARGE ESTIMATION OF LITHIUM ION BATTERY IN
ELECTRIC VEHICLE USING EXTENDED KALMAN FILTER**

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Abstract- In recent years, global warming is increasing rapidly due to pollution. Therefore to avoid these problems, Electric Vehicle (EV) is the best choice for environment in terms of transportation. Battery plays a vital role in electric vehicle. Many batteries are available in market. Lithium ion battery is the most preferred one for Electric Vehicle because of high energy density and excellent capacity. Lithium ion batteries are unsafe when they are operated out of Safe Operating Area (SOA). With the help of “Battery Management System” (BMS) they can be operated within their limits. State of Charge (SOC) estimation is an important function of BMS in the EV.



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NCPED32- SMART MICRO-GRID SYSTEM WITH WIND/PV/BATTERY

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Abstract- A 6KW smart micro-grid system with wind/PV/battery has been designed, the control strategy of combining master-slave control and hierarchical control has been adopted. An energy management system based on battery SOC has been proposed for the smart micro-grid system so that the management functions, such as measurement and testing, protection, operation mode selection, power supply control and load management of the smart micro-grid, can be realized. The performance of the micro grid and the control strategy presented in the paper has been demonstrated and verified in various operation modes, including direct supply of wind and solar energy, energy feedback to grid, power supply from battery, power supply by external power grid and load limitation modes



**NCPED33- DESIGN AND IMPLEMENTATION OF AUTOMATION SYSTEM ON
SMART LV GRID**

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Abstract- This paper presents an electrical system that overcomes a brand-new technology called the smart grid. The transition duration between the out-of-date wattage electric power system and also the complete smart grid depends on well-designed control strategic plans, so considering economic feasibility, without which no solution thrives. During this technique for a union of the out-of-date power distribution grid to the smart grid pattern by retrofitting the legacy circuit that composes this grid. The result implies the applying of such a technique, through a distribution low voltage system platform with integrated technological resources added to the legacy structure, converts these passive grid into an intelligent circuit which has the ability to support a smart grid with a scope of functionalities simulation.



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**NCPED34- CONTROLLING THE VOLTAGE FLUCTUATIONS IN HYBRID SYSTEM
USING DVR**

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Abstract- The power quality disturbances such as voltage sag, swell is mitigated by using power electronic based device Dynamic Voltage Restorer (DVR) which is of seven level multilevel inverter composed of Cascaded H-bridge topology. The solar and wind acts as a source to the Hybrid Multilevel Inverter (DVR) to compensate any voltage disturbances that occur in the system. Software in order to evaluate the performance of solar –wind based DVR in mitigating voltage sag, swell. The simulation results show that the proposed multilevel inverter is very efficient to compared to conventional Multilevel Inverter. The invention of various custom power devices such as Distributed Static Compensator (D-STATCOM), Dynamic Voltage Restorer (DVR), and Unified Power Quality Conditioner (UPQC) can be used to mitigate Voltage sag and swell. Custom power devices are most efficient and effective modern devices used in power distribution networks.



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NCPED35- APPLICATIONS OF LIQUID CRYSTAL

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Abstract- The liquid crystal (LC) has produced a technical and industrial revolution over the previous few decades due to the fruitfulness of accompanying physical phenomena in addition to its hi-tech importance in electro-optical devices. LCs has become the essential self-assembling molecular materials of the current era in the form of LC display. In research lateral, the more recent advent of Nano-science has created an uprising in this field with “Plasmonics”. To control and manipulate the light at nano scale dimensions by plasmon formed on nanostructure. This is the key idea to develop novel optical materials and new devices. Later invent of surface plasmons with meta material to develop photonic and electronic components like laser, single-photon sources, transistors, and detectors.



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NCPED36- OPTIMAL SIZING OF HYBRID RENEWABLE ENERGY SYSTEM

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Abstract-Power is generated from the thermal power plants through firing of coal & burning of fossil fuels. Fossil fuel burning cause more pollution. Hence the renewable energy plays an important role in pollution free power generation in today's scenario. In this project, the integration of various renewable technologies like photovoltaic panels and Wind turbine generators to supply the reliable power to the end user. This leads to design the grid connected Hybrid Renewable Energy System (HRES). The backup supply is provided by the Battery Energy Storage System (BESS). Unit sizing of PV panels, wind turbine generators and the number of batteries need to set up in specified area is calculated. Effective minimization of cost & maximisation of Availability Index (AI) of power supply to the end user is performed. This objective is satisfied by the implementation of Single objective Particle Swarm Optimization technique & bi-objective optimisation is performed using Multi Objective Genetic Algorithm (MOGA) technique. By evaluating the fitness function, the magnitude of power need to be purchased from the power grid is calculated and the total investment is determined. Availability of the system is also measured by the factor of Demand Not Met (DNM) factor. This project gives clear path & idea to work in an optimized way in an industry for setting up the new power generation plant and realization of cost in purchasing the desired raw materials for erection and commissioning of the power plant. This project enhances to make every individual to set up a roof top hybrid renewable system for suitable Home Energy Management System (HEMS) in a small scale & also used to set up a large solar & wind farm for commercial export of Power to the National Grid.



**NCPED37- CLOSED-LOOP ATTITUDE CONTROL SYSTEM USING RATE
GYROSCOPES FOR FLIGHT VEHICLES**

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Abstract- The spacecraft must maintain a desired orientation in order to perform their basic mission. The sensors in flight vehicle must be pointed in specific directions at different times. The attitude control system is required for maintaining a fixed orientation, or to match the changing orientation of another body, in the presence of the disturbing torques. The representation of Attitude or orientation of any flight vehicles may be by Euler axis and principal angle combination. Maintaining a specific orientation, or changing the orientation with time in specific manner, is about crucial for effectiveness of flight vehicles. The control of flight is possible only by an automatic mechanism in order to reduce the pilot work load. The principal analog devices employed in flight control applications are gyroscopic sensors, accelerometers etc. The objective is to analyse the effect of Rate Gyro and Rate integrating Gyro to the mathematical model of flight vehicles and its influence in response of their respective orientation or attitude angles.



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**NCPED38- MULTI SOURCE SWITCHED CAPACITOR BASED BOOST H-BRIDGE
CONVERTER FOR RENEWABLE ENERGY BASED SYSTEMS**

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Abstract- In this paper, a multi-source switched capacitor-based boost H-Bridge converter is proposed. The features of proposed system are less number of components, high gain, self-charging capability of capacitors, and reduced size of filter components. The analytical performance of the proposed converter topology is verified through simulation studies. The proposed converter system with two sources and two capacitors for power rating of 350 W is developed and tested with resistive loads. The experimental and simulated results are in close agreement with the analytical steady-state performance of the proposed converter system.



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**NCPED39- IMPLEMENTATION OF VEHICLE TO VEHICLE HORN SYSTEM
USING RF TECHNOLOGY**

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Abstract- In this project proposed a Vehicle to Vehicle horn system. It can be accomplished by RF module. RF transmitter which is used to transmit the signal from one vehicle to another vehicle and RF receivers are inserted behind the car to receive the corresponding transmitted signal from the other vehicles. A buzzer and LED is used to alert the driver and a LCD is used to show from where the transmitted signal has been come. The whole functions of the system are processed by arduino. The goal of this work to reduce unnecessary vehicle horn. This system can be used as a substitution of horn system in the horn prohibited area.



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**NCPED40- ELECTRIC VEHICLE CHARGING STATION WITH 2WAY SOURCE
WITH POWER MANAGEMENT AND STATION MAINTENANCE**

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Abstract- To compete with gas station EV charging station need to be charge faster manner, here the charging of Electric Vehicle module using the Solar power and AC power, availability of maximum power is viewed by IOT device and the maximum power generated by the solar is being tracked using the MPPT controller. The simulation model is designed using Proteus software. The whole setup is connected to the Arduino, the battery level, generated and distributes an amount of the battery is viewed using an LCD. Personal computer is used to update the sensor value to online. A web page is used to check the availability status of charge, the amount of power transferred to the charging module and the available location for the charging station can be displayed. The main idea of this project is to reduce greenhouse gas emission and fossil fuel. By using an RFID Card Reader, Keypad and a Micro controller for authentication of a person. The data from the RFID Reader is transmitted to a remote computer through a RS232 Interface.



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NCPED41- SEARCH ENGINE PROCESS REVIEW

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Abstract- A Web search engine is a software system that is being developed for searching more information in the World Wide Web. A search engine maintains the following process in near real time: Web crawling, Indexing and Searching. Web search engines grab the information through the web crawling from site to site. The “spider” goes through for the standard file name robots. text .Before sending a certain information to be indexed it is necessary to check the factors like titles, page content, java script, cascading style sheets(CSS), headings as it is needed to be much similar to the evidence provided by the standard HTML markup of the informational content, or its metadata in html meta tags. Indexing means of associating the words and eligible tokens, where it is a public database. In such a way it provides a platform for web search queries. When a user places a query even in a single word, it automates the index to find information relating to the query as quickly as possible.

MEMORIES OF NCPED'19



NCPED'20



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