International Conference on "Advances in Electrical and Electronics Engineering"

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Department of *Electrical and Electronics Engineering* Presents

International conference on

" Advances in Electrical and Electronics Engineering "

on 30th & 31th March 2022

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Editor in chief
Dr.P.Santosh Kumar Patra

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National ranking by ARIIA

NIRF ranked

88 MOUs

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594 crores funding received

(ICAEEE-22)

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Department of Electrical and Electronics Engineering

Online "International Conference on Advances in Electrical and Electronics Engineering" during 30th & 31st March 2022

(ICAEEE – 2022)

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Sri. M. LAXMAN REDDY
CHAIRMAN

MESSAGE

I am extremely pleased to know that the Department of Electrical and Electronics Engineering, of St. Martin's Engineering College is organizing Online **"International Conference on Advances in Electrical and Electronics Engineering"** during 30th and 31st of March 2022. I understand that the large number of researchers has submitted their research papers for presentation in the conference and also for publication. The response to this conference from all over India and Foreign countries is most encouraging. I am sure all the participants will be benefitted by their interaction with their fellow researchers and engineers which will help for their research work and subsequently to the society at large.

I wish the conference meets its objective and confident that it will be a grand success.

M. Laxman Reddy

M. LAXMAN REDDY
Chairman

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Sri. G. CHANDRA SEKHAR YADAV
EXECUTIVE DIRECTOR

MESSAGE

I am pleased to state that the Department of EEE Engineering of SMEC is organizing Online **"International Conference on Advances in Electrical and Electronics Engineering"** during 30th and 31st of March 2022. For strengthening the "MAKE IN INDIA" concept many innovations need to be translated into workable product. Concept to commissioning is a long route. The academicians can play a major role in bringing out new products through innovations.

I am delighted to know that there are large number of researchers have submitted the papers on Interdisciplinary streams. I wish all the best to the participants of the conference additional insight to their subjects of interest.

I wish the organizers of the conference to have great success.

G. CHANDRA SEKHAR YADAV
Executive Director

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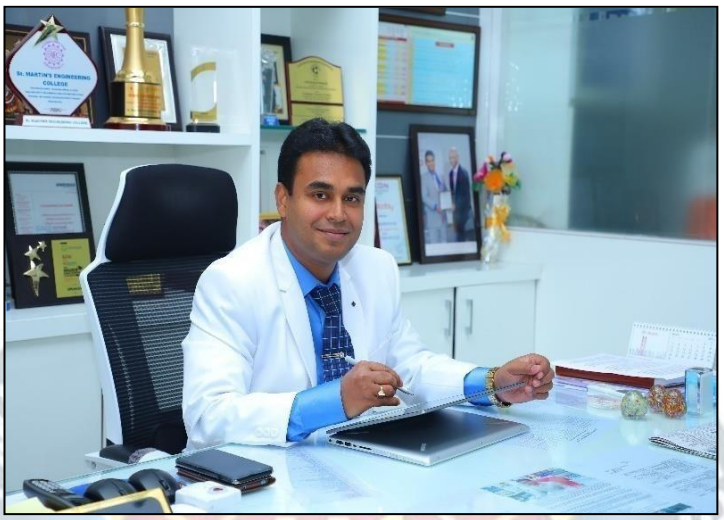

I am delighted to be the Patron & Program Chair for the Online **"International Conference on Advances in Electrical and Electronics Engineering"** organized by the Department of EEE on 30th and 31st of March 2022. I have strong desire that the conference to unfold new domains of research among the EEE Engineering fraternity and will boost the knowledge level of many participating budding scholars throughout the world by opening a plethora of future developments in the field of EEE Engineering.

The Conference aims to bring different ideologies under one roof and provide opportunities to exchange ideas, to establish research relations and to find many more global partners for future collaboration. About 56 research papers have been submitted to this conference, this itself is a great achievement and I wish the conference a grand success.

I appreciate the faculties, coordinators and Department Head of EEE Engineering for their continuous untiring contribution in making the conference a reality.

(Dr. P. Santosh Kumar Patra)
Principal

St. MARTIN'S ENGINEERING COLLEGE
Dhulapally, Secunderabad – 500100
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CONVENER

The world is always poised to move towards new and progressive engineering solutions that results in cleaner, safer and sustainable products for the use of mankind. India too is emerging as a big production center for world class quality. Electrical and Electronics Engineering plays a vital role in this endeavor.

The aim of the online "International Conference on Advances in Electrical and Electronics Engineering" being conducted by the Department of Electrical and Electronics Engineering of SMEC, is to create a platform for academicians and researchers to exchange their innovative ideas and interact with researchers of the same field of interest. This will enable to accelerate the work to progress faster to achieve the individuals end goals, which will ultimately benefit the larger society of India.

We, the organizers of the conference are glad to note that 98 papers have been received for presentation during the online conference. After scrutiny by editorial board 56 papers have been selected, and the authors have been informed to be there at the online platform for presentations. Steps have been to publish these papers with ISBN number in the Conference Proceedings and all the selected papers will be published in Scopus / UGC recognized reputed journals.

The editorial Committee and the organizers express their sincere to all authors who have shown interest and contributed their knowledge in the form of technical papers. We are delighted and happy to state that the conference is moving towards a grand success with the untiring effort of Head of the department, faculties and staff members of SMEC and with the blessing of the Principal and Management of SMEC

Ramchandra

Dr. N. Ramchandra
Convener, ICAEEE-2022
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30th& 31st March 2022 Paper Id: ICAEEE-001

NEW TRENDS IN ACTIVE FILTERS FOR POWER CONDITIONING

Mr. K. V. Govardhan Rao[1], Dr. N. Ramchandra[2], Mrs. T. V. Sai Kalyani[3]
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St. Martin's Engineering College (Autonomous), Secunderabad, - 500100, Telangana, India

Abstract

Attention has been paid to active filters for power conditioning which provide the following multi functions: reactive power compensation, harmonic compensation, flicker unbalance compensation, and or voltage regulation. Active filters in a range of 50 LVA-60 MVA have been practically installed in Japan. Soon, the term "active filters" will have a much wider meaning than it did in the 1970's. For instance, active filters intended for harmonic solutions are expanding their functions from harmonic compensation of nonlinear loads into harmonic isolation between utilities and consumers, and harmonic damping throughout power distribution systems. This paper presents the present status of active filters based on state-of-the-art power electronics technology, and their prospects and directions toward the 21st century, including the personal views and expectations of the author.

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ON-LINE AND OFF-LINE MONITORING-DIAGNOSIS SYSTEM (MDS) FOR POWER TRANSFORMERS

Mrs. T. V. Sai Kalyani[1], Dr. N. Ramchandra[2], Mr. K. V. Govardhan Rao[3]
[1,3] Assistant Professor in EEE Department, [2] Professor and HOD in EEE Department
St. Martin's Engineering College (Autonomous), Secunderabad, - 500100, Telangana, India

Abstract

The safe operation and the extension of there mained lives of power transformers have been dominant objectives during the last years. An accurate assessment of there mained life could be an important instrument for the safety of the power transformers in operation. The paper presents the structure and the using mode for an integrated monitoring-diagnosis system (SMD) for power transformers. The monitoring-diagnosis system allows on-line analysis on a desktop application, a web application and off-linear analysis for determining the transformer condition, by means of which there are surveyed: _ Cooling system condition.

- OLTC condition.
- Bushing condition.
- Insulation system condition.
- Partial discharge evolution.
- Transformer switching in/switching off.
- Exceeding of monitored parameter limits.
- Estimation of remained life.

SMD allows determining accurately the transformer condition and the monitored parameters evolution in time, avoiding the appearance of incidents and failures, and specifying certain type of maintenance.

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DC POWER SYSTEMS WITH CONSTANT POWER LOADS

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St. Martin's Engineering College (Autonomous), Secunderabad, - 500100, Telangana, India

Abstract

This paper describes a novel stabilizing control strategy for dc power systems with constant power loads. The destabilizing element associated with a constant power load is eliminated by reformulating the system dynamic equations in terms of the rate of change of energy, or instantaneous power. A power shaping control strategy is employed to regulate the output voltage, while essentially maintaining large-signal system stability with increased region of attraction. The proposed control strategy is simple and easy to design and implement. Its utility and effectiveness are demonstrated by simulations and experiments.

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DEVELOPMENT OF A BI-DIRECTIONAL DC/DC CONVERTERWITH DUAL-BATTERY ENERGY STORAGE FOR HYBRIDELECTRIC VEHICLE SYSTEM

Ms. N. Sravani[1], Mr. G, Ashok Reddy[2], Ms. Varala Sravika[3], Mr. Vinesh[4]
[1, 2, 3, 4]B. Tech Student Scholar in EEE Department
St. Martin's Engineering College (Autonomous), Secunderabad, - 500100, Telangana, India

Abstract

This study develops a newly designed, patented, bi-directional dc/dc converter (BDC) that interfaces main energy storage (ES1), an auxiliary energy storage (ES2), and dc-bus of different voltage levels, for application in hybrid electric vehicle systems. The proposed converter can operate in a step-up mode (i.e., low-voltage dual-source-powering mode) and a step-down(i.e., high-voltage dc-link energy-regenerating mode), both with bi-directional power flow control. In addition, the model can independently control power flow between any two low-voltage sources (i.e., low-voltage dual-source buck/boost mode). Herein, the circuit configuration, operation, steady-state analysis, and closed-loop control of the proposed BDC are discussed according to its three modes of power transfer. Moreover, the simulation and experimental results for a 1 kW prototype system are provided to validate the proposed converter.

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COMPARATIVE STUDY OF SMOOTH START OF THREE PHASE INDUCTION MOTOR USING MATLAB SIMULINK

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Abstract

Asynchronous machines are considered nowadays the most used electrical machines, which are mainly used as electrical induction motors. Starting the induction motor is the most important and dangerous step. This project presents a comparison between the Direct-On-Line (D.O.L.) Starter and Soft Starter by using MATLAB Simulink. The purpose of this project is to find out the theoretical and actual characteristics of Induction motor. These two basic starting methods which different the irrespective wiring connection are the most applicable and widely used starting method in the industrial area due to its economic reasons. This project is done by analyzing the characteristics during the motor starting by using the MATLAB Simulation to capture the waveforms of these events. After the Simulation, the two different starting method are being compared to conclude the most suitable and applicable starting method.

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A NOVEL DESIGN OF HYBRID ENERGY STORAGE SYSTEM FOR ELECTRIC VEHICLES

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Abstract

To provide long distance endurance and ensure the minimization of a cost function for electric vehicles, a new hybrid energy storage system for electric vehicle is designed in this paper. For the hybrid energy storage system, the paper proposes an optimal control algorithm designed using a Li-ion battery power dynamic limitation rule-based control based on the SOC of the super capacitor. At the same time, the magnetic integration technology adding a second-order Bessel low-pass filter is introduced to DC-DC converters of electric vehicles. As a result, the size of battery is reduced, and the power quality of the hybrid energy storage system is optimized. Finally, the effectiveness of the proposed method is validated by simulation and experiment.

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IMPLEMENTATION OF SMART PREPAID ENERGY METER USING IOT

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Abstract

Doctors are usually needed to work at every hospital and emergency centre every now and then. But it is not feasible for every doctor to be available at every place at desired time. The problem with video calling is that video calls need to be done from a PC or laptop on a desk. This limits the doctor's capacity to view patient or around operation theatre at will or even move through hospital rooms as needed. To help solve this issue we here develop a virtual doctor robot that allows a doctor to virtually move around at a remote location at will and even talk to people at remote location as desired. This robot provides a whole lot of advantages for doctors:

- Doctors ability to be at anyplace anytime
- Doctors can move around in operation theatres
- Doctors can move around the patient with ease
- Doctors can see medical reports remotely via video calls
- Doctors can move around in other rooms at will
- The system makes use of a robotic vehicle with 4-wheel drive for easy navigation.

The robot also includes a controller box for circuitry and a mounting to hold a mobile phone or tablet. The mobile or tablet is used to hold live video calls. The doctor can use an IOT based panel to control the robot. The control commands sent online are received by the robot controller. The robot controller operates over WIFI internet. The received commands are received in real time and the robot motors are operated to achieve the desired movement commands. Also the root has other functions including battery status alert to remind of battery charging on time.

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AN EXPERIMENTAL STUDY OF SYNCHRONOUS GENERATOR AND IMPLEMENTATION OF A HYBRID MICRO GRID TO TRACK AND CONTROL THE POWER QUALITY

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Abstract

The hybrid micro grid design of the power quality and synchronous generator, sync and synchronous generator, is the basis for this study. The case study findings highlight the importance of site-specific characteristics and their impact on the best micro grid design under various power system conditions. Micro grid design combines a plethora of effect elements that are location-dependent, such as technological advancement, economic feasibility, and environmental repercussions. A comprehensive approach for designing micro grids based on power system analysis. During machine operation, the diesel generator serves as the primary voltage source in the shielded mode of the micro grid, while the synchronous generator assists in maintaining the system's power balance. The following energy conservation strategy was presented, with the net capacity of the micro grid split between the high and low frequency components. The high-speed system eliminates the component, while the synchronous generator systems balance the low-frequency component. The anticipated energy management strategy enables the micro grid network to generate controlled electricity.

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IOT SMART ENERGY GRID

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Abstract

The Energy generation companies supply electricity to all the households via intermediate controlled power transmission hubs known as Electricity Grid. Sometimes problems arise due to failure of the electricity grid leading to black out of an entire area which was getting supply from that grid. This project aims to solve this problem using IOT as the means of communication and tackling various other issues which a smart system can deal with to avoid unnecessary losses to the Energy producers. The IOT Smart Energy Grid is based on the AT mega family controller which controls the various activities of the system. The system communicates over the internet by using Wi-Fi technology. A bulb is used in this project to demonstrate as a valid consumer and a bulb to demonstrate an invalid consumer. The foremost thing that this project facilitates is reconnection of transmission lines to the active grid. If an Energy Grid becomes faulty and there is another Energy Grid, the system switches the Transmission Lines towards this Grid thus facilitating uninterrupted electricity supply to that region whose Energy Grid went OFF. And this information ofwhich Grid is active is updated over IOT where the authorities can login and can viewthe updates. Apart from monitoring the Grid this project has advanced capabilities of monitoring energy consumption and even detect theft of electricity. The amount of electricity consumed, and the estimated cost of the usage gets updated on the IOT along with the Energy Grid information. In this way the Smart Energy Grid project makes sure that the electricity supply is continuous and helps in maintaining an updated record of consumption and theft information which is quite valuable information for the energy producing companies.

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CROP SHIELD SYSTEM WITH IOT TECHNOLOGY SURVEILLANCE AUTO AFFUSION

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Abstract

In India, agriculture is the most fundamental source of income. It has a significant impact on the country's economy. However, there is a hindrance in agriculture these days due to the migration of people from rural to urban areas. Monitoring environmental factors is not a full strategy for increasing agricultural productivity. There are several elements that have a significant impact on productivity. Hence To address these issues, agriculture must utilize automation. A farmer can save time, money, and energy by using an automatic watering system. Irrigation systems used in traditional farmland require manual intervention. Human intervention can be reduced using irrigation equipment that is automated. Crops may be continuously sensed and monitored thanks to the convergence of sensors and the Internet of Things (IoT). By educating farmers about crop growth and harvest times on a regular basis, resulting in increased agricultural productivity and proper product distribution to end users at the right time and location. To address this issue, we will employ a smart agricultural approach based on IoT. This project involves sensors for gathering and analyzing field data, such as temperature, humidity, and soil moisture. To remotely manage and monitor data from the sensors, these sensors are integrated with well-established web technology in the form of a wireless sensor network.

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MODELLING OF PARALLEL HYBRID TRANSMISSION FOR ELECTRIC VEHICLES

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Abstract

The electric vehicle has been researched as an alternate mode of transportation due to rising environmental concerns and ever-stricter emissions laws. However, due to its limited range and lengthy charging times, the electric vehicle has not yet proven to be an acceptable answer for the automobile consumer. One approach of utilizing the great efficiency and absence of emissions of an electric vehicle while maintaining the range and convenient refueling periods of a normal gasoline-powered vehicle is to add an internal combustion engine to increase the range of the electric vehicle. The term that describes this type of vehicle is a hybrid electric vehicle. A hybrid vehicle is one that is powered by at least two different sources of energy. A vehicle with an electric motor as one of its power sources is referred to as a "hybrid-electric vehicle. "The other source of motive power can be a variety of technologies, but the most typical is a gasoline or diesel-fueled internal combustion engine. This paper presents Modeling of Parallel Hybrid Transmission for Electric Vehicles

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FOOTSTEP POWER GENERATION FOR RURAL ENERGY APPLICATION TO RUN A.C AND D.C LOADS

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Abstract

In day-to-day life the utilization of power turns to be necessary for each work. The power delivered in this paper will not contaminate the surroundings and it is also will not rely upon the climate conditions. The paper proposes a novel technique for the creation of power utilizing piezoelectric sensors kept along the footpaths which can be ready to charge the battery and ready to supply the force at whatever time of our prerequisite. The footstep power generation technique through piezoelectric sensors produces electrical force by changing mechanical energy of the development of individuals on the floor to electrical energy. The benefits of piezoelectric force generation framework are that it is sheltered and secure to utilize, it doesn't make any issue or distress for the general population strolling through footpath, and it is chance free strategy. Footstep power generation technique has mechanical part and in addition electrical part, however the electrical and mechanical losses are negligible. This framework additionally can store the electrical force away battery. The power produced by this technique can be utilized for helping up the road lights, additionally for activity reason, sign boards of streets. At long last the force which will be abandoned can be given to national grid for power reason.

The electrical power consumption is increasing exponentially. Therefore, the need of a fool-proof and economically viable power generation and distribution system demands a certain interest. This paper proposes utilization of human locomotion energy which, although extractable goes mainly to waste. This paper proposes a model that uses human walking, jumping, and running as a source of energy and store it for essential use. Such a model is apt in a demography that of a country like India which has such a huge pedestrian population. This paper illustrates a method for harvesting this human locomotion energy with the use of piezoelectric sensor and demonstrates an application with the stored energy i.e., to charge a mobile phone securely. The ground reaction force (GRF) exerted from the foot, when converted to voltage by piezoelectric sensors is capable enough to power up a device. Successive exertion leads to a periodic voltage build up which with proper circuitry can be used to charge a storage battery. The power produced by this technique can also be employed in basic application such as street lighting, notice boards, gyms, and other areas of public domain. It also promotes green energy and environment friendly approach towards energy generation

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BLACK BOX IN AUTOMOBILES TO PREVENT ACCIDENTS

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Abstract

Automobiles and computing technologies are creating a new level of data services in vehicles. The Automobile Black Box has functions like an airplane black box. It is used to analyze the cause of vehicular accidents and prevent the loss of life and property arising from vehicle accidents. This paper proposes a prototype of an Automobile Black Box System that can be installed into vehicles. The system aims to achieve accident analysis by objectively tracking what occurs in vehicles. The system also involves enhancement of security by preventing tampering of the Black Box data. In addition, the Black Box sends an alert message to a pre-stored mobile number via Short Message Service (SMS) in the case of occurrence of an accident. The proposed system makes use of various sensors to record the various driving data parameters. The Arduino controller is used to regulate these sensors. The system uses external sensors such as camera and Global Positioning System (GPS) to collect video and location data.

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ANALYSIS OF ELECTRIC VEHICLE OF WIRELESS CHARGING SYSTEM

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Abstract

This paper presents the analysis of rectifier load used for electric vehicle (EV) wireless charging system, as well as its applications on compensation network design and system load estimation. Firstly, a rectifier load model is designed to get its equivalent input impedance, which contains both resistance and inductance components, and can be independently calculated through the parameters of the rectifier circuit. Then, a compensation network design method is proposed, based on the rectifier load analysis. Furthermore, a secondary side load estimation method and a primary side load estimation method are put forward, which adopt only measured voltages and consider the influence of the rectifier load. Finally, an EV wireless charging simulation model is developed, and experimental results have proved that the rectifier equivalent load can be correctly calculated on conditions of different system load resistances, rectifier input inductances, DC voltages, and mutual inductances. The simulation also show that rectifier load equivalent inductance will impact system performances, and the proposed methods have good accuracy and robustness in the cases of system parameter variations

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DYNAMIC POWER MANAGEMENT AND CONTROL OF PV PEM FUEL CELL BASED STANDALONE AC/DC MICROGRID USING HES

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Abstract

In this project, dynamic power management scheme is proposed for standalone hybrid AC/DC micro-grid which constitutes photovoltaic (PV) based renewable energy source, proton exchange membrane (PEM) fuel cell (FC) as a secondary power source and battery-super capacitor as hybrid energy storage. The power management scheme (PMS) generates current references for dc converter current controllers of fuel cell, battery, and super capacitor. The average and fluctuating power components are separated using moving average filter. The proposed power management scheme is validated using simulation results.

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CONTROL OF A THREE-PHASE HYBRID CONVERTER FOR A PV CHARGING STATION.

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Abstract

Hybrid boost converter (HBC) has been proposed to replace a dc/dc boost converter and a dc/ac converter to reduce conversion stages and switching loss. In this paper, control of a three-phase HBC in a PV charging station is designed and tested. This HBC interfaces a PV system, a dc system with a hybrid plug-in electrical vehicle (HPEVs) and a three-phase ac grid. The control of the HBC is designed to realize maximum power point tracking (MPPT) for PV, dc bus voltage regulation, and ac voltage or reactive power regulation. A test bed with power electronics switching details is built in MATLAB for validation. Simulation results demonstrate the feasibility of the designed control architecture. Finally, lab experimental testing is conducted to demonstrate HBC's control performance.

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AUTONOMOUS POWER CONTROL AND MANAGEMENT BETWEEN STANDALONE DC MICROGRIDS

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Abstract

Renewable integrated DC Microgrids (DCMGs) are gaining popularity by feeding remote locations in qualitative and quantitative manner. Reliability of autonomous DC microgrids (ADCMG) depend on battery capacity and size due to stochastic behavior of renewable. Over charging and discharging scenarios compel the microgrid into insecure zone. Increasing the storage capacity is not an economical solution because of additional maintenance and capital cost. Thus interconnecting neighbor microgrids increases virtual storing and discharging capacity when excess power and deficit scenario arises respectively in any of the DCMG. Control strategy plays vital role in regulating the power within and between microgrids. Power control and management technique is developed based on bus signaling method to govern sources, storages and loads to achieve effective coordination and energy management between microgrids. Proposed scheme is simple and reliable since bus voltages are utilized in shifting the modes without having dedicated communication lines. Proposed scheme is validated through real time simulation of two autonomous DC grids in real time digital simulator (RTDS) and its results are validated by hardware experimentation.

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AUTONOMOUS POWER MANAGEMENT FOR INTERLINKED AC-DC MICROGRIDS

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Abstract

The existing power management schemes for interlinked AC-DC microgrids have several operational drawbacks. Some of the existing control schemes are designed with the main objective of sharing power among the interlinked microgrids based on their loading conditions, while other schemes regulate the voltage of the interlinked microgrids without considering the specific loading conditions. However, the existing schemes cannot achieve both objectives efficiently. To address these issues, an autonomous power management scheme is proposed, which explicitly considers the specific loading condition of the DC microgrid before importing power from the interlinked AC microgrid. This strategy enables voltage regulation in the DC microgrid and reduces the number of converters in operation. The proposed scheme is fully autonomous while it retains the plug-nplay features for generators and tie-converters. The performance of the proposed control scheme has been validated under different operating scenarios. The results demonstrate the effectiveness of the proposed scheme in managing the power deficit in the DC microgrid efficiently and autonomously while maintaining the better voltage regulation in the DC microgrid.

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AN INTEGRATED MULTIPORT DC-DC CONVERTER WITH ELECTRIC VEHICLE

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Abstract

This paper proposes An Integrated Multiport DC-DC Converter with Electric Vehicle with dual input of solar, fuel cell and the obtained output is given to Electric Vehicle. EVs are vehicles that are either partially or fully powered on electric power. Electric vehicles have low running costs as they have less moving parts for maintaining and also very environmentally friendly as they use little or no fossil fuels (petrol or diesel).As the conventional sources are tends to depleting, the alternative ways are chosen to generate electrical power nothing but non-conventional energy sources. Energy conversion always involves a DC section. So, it is mandatory to focus on the DC-DC converters. As huge progress takes place in power electronics field, multiport converters are one of the greatest deals. It treats the whole system as a single power converter, gives high efficiency. Multiport dc-dc converters are compact in structure with fewer components, lower cost compared to numerous DC-DC converters. The existing topology of the multiport DC-DC Converter used four switches but the proposed topology used only two switches results in reduction of switching losses and the output voltages are high and regulated. The closed loop PI controlling strategy is adopted. The results were verified by using MATLAB simulink Software.

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SINGLE-STAGE ZETA-SEPIC-BASED MULTIFUNCTIONAL INTEGRATED CONVERTER FOR PLUGIN ELECTRIC VEHICLES

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Abstract

A single-stage-based integrated power electronic converter has been proposed for plug-in electric vehicles (PEVs). The proposed converter achieves all modes of vehicle operation, i.e. plug-in charging, propulsion and regenerative braking modes with wide voltage conversion ratio (M) [M <1 as well as M>1] in each mode. Therefore, a wide variation of battery voltage can be charged from the universal input voltage (90–260 V) and allowing more flexible control for capturing regenerative braking energy and dc-link voltage. The proposed converter has least components compared to those existing converters which have stepping up and stepping down capability in all modes. Moreover, a single switch operates in pulse width modulation in each mode of converter operation hence control system design becomes simpler and easy to implement. To correctly select the power stage switches, a loss analysis of the proposed converter has been investigated in ac/dc and dc/dc stages. Both simulation and experimental results are presented to validate the operation of the converter

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HOME AUTOMATION USING ARDUINO

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Abstract

This project presents the overall design of Home Automation System (HAS) with low cost and wireless system. It specifically focuses on the development of an IOT based home automation system that can control various components via internet or be automatically programmed to operate from ambient conditions. In this project, we design the development of a firmware for smart control which can successfully be automated minimizing human interaction to preserve the integrity within whole electrical devices in the home. We used Arduino, a popular open source IOT platform, to execute the process of automation. Different components of the system will use different transmission mode that will be implemented to communicate the control of the devices by the user through Arduino to the actual appliance. The main control system implements wireless technology to provide remote access from smart phone. The project aims at designing an advanced home automation system using normal web server and Wi-Fi technology. The devices can be switched ON/OFF like bulbs and Fans in real time.

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PWAM BOOST CONVERTER/INVERTER WITH FLCFOR HEV/EV MOTOR DRIVE APPLICATIONS

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Abstract

This project initiates a novel control strategy "PWAM" based boost converter/inverter fed fuzzy logic controller for HEV/EV motor drive applications. This modulation method is unusual from other pulse width modulation methods that have been well examined or universally used for the inverter in HEV/EV system. By using this technique, only one phase leg of the inverter is doing switching action for each PWM-carrier period. The boost converter is accountable for generating the unpredictable dc-link voltage; thus desires quick manage particularly when the output fundamental frequency of the inverter is high. However, the boost converter undergoes from short bandwidth due to the continuation of a right-half-plane (RHP) zero. A newly introduced single-phase PWM control method, which was first proposed in for grid-connected solar inverters, is established to be promising in motor drive applications. The outer loop guarantees steady-state reference tracking concert, and the inner loop affords fast dynamic compensation for system conflict (including sudden reference or load changes) and improves stability. The proposed concept can be verified and simulated using MATLAB/SIMULINK software.

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ELECTRONICS AND POWER ELECTRONICS DEVICES IN DISSIPATED POWER SYSTEMS WITH FUEL CELLS

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Abstract

The fuel cell features are presented in the paper. During description of systems of supplying auxiliaries with fuel cells, special attention is paid to problems of electronics and power electronics. The article has presented range of schemes, with fuel link matches cooperating. Cooperation of fuel link from different kinds of electronics and power electronics will enable realization of the following electronic purposes: operation with stabilized constant DC output voltage, operation with stabilized constant AC output voltage and operation fuel cell a source connected with inverter in distributed AC system. Accuracy of the choice of suitable solutions of power electronics systems will be confirmed by the chosen results of simulation and laboratory investigations.

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FACE MASK DETECTION USING BOUNDING BOX ALGORTIHM UNDER COVID-19 CIRCUMSTANCES

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Abstract

Corona viral illness (COVID-19) is a new strain of human disease discovered in 2019. It has never been discovered before. The Corona virus is a large viral family that causes illnesses ranging from the common cold to serious respiratory problems such as asthma and emphysema in humans. MERS-COV (Middle East Respiratory Syndrome) and Respiratory System Severe Acute Respiratory Failure Syndrome (SARS-COV). This is a position that many people are currently in. According to famous scientists, wearing face masks and keeping a six-foot social distance are the most efficient ways to keep the virus at bay. In the United States, there is a scarcity of experimental evidence on the usage of face masks, and no large-scale investigations have been done. As a result, evaluating population compliance with mask recommendations may be important in current and future pandemics. If researchers understand how masks are utilized, they will be able to answer multiple questions about the spread in various locations. Affected people and patients are being treated all around the world, culminating in a global epidemic. A number of countries have proclaimed a state of emergency. To stay up with the global trend, this research employs the Bounding Box algorithm to detect masks over faces in public locations in order to prevent the Corona virus from spreading communally. This study is primarily concerned with identifying those who are not properly using face masks. This project makes use of either an online data source or a data set that was developed from scratch. The project will be carried out using MATLAB.

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OPTIMIZATION AND MANAGEMENT OF ENERGY POWER FLOW IN HYBRID ELECTRICAL VEHICLES

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Abstract

The use of optimization algorithm for the management of energy on vehicles electrical is an innovative argument in the field of the transports. In this context, beginning from an accurate model of electrical device, is necessary to identify the performances to reproduce the physical behavior of the considered vehicle. Particularly it is necessary to start from a model that takes into account several details including Battery and all the electrical loads.

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PREVENTING TRANSFORMER SATURATION IN BI-DIRECTIONAL DUAL ACTIVE BRIDGE BUCK-BOOST DC/DC CONVERTERS

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Abstract

In switch-mode power electronic converters, DC offset of the magnetizing flux in the isolation transformer can cause saturation. In typical single-ended dc/dc converters, this is handled using a current loop which ensures that the average current in the winding is zero. For bi-directional dc/dc converters with active bridges on both sides, there exists a danger of impressing dc offsets from both sides, creating significant issues in terms of preventing transformer saturation. This paper demonstrates the issue for the Dual Active Bridge Buck Boost converter (DAB 3). The paper also presents a control strategy for avoiding such saturation, eliminating DC currents on both sides, while realizing full converter control. The paper presents simulation results to prove the proposed control technique.

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A NOVEL ELECTRIC VEHICLES CHARGING/DISCHARGING MANAGEMENT PROTOCOL BASED ON QUEUING MODEL

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Abstract

High electric vehicles (EVs) penetration is expected to increase smart grid solicitation especially with various EV charging demands. As result, the EV charging process at the supply station has to be managed in the way to promote the EV satisfaction level while preserving smart grid stability. In this article, the bidirectional power flow between EV and grid; Grid-to-Vehicle (G2V)and Vehicle-to-Grid (V2G), is exploited. We make a profit from the unused electric power of EVs and we present an EV load management technique based on EV charging and EV discharging coordination. We propose a peak load management model (PLM)used to schedule EVs for charging or discharging service according to the power demand with the timing and location where each EV need to be served. Also, we propose an Electric Vehicle Supply Equipment (EVSE) selection model to guide EVs to the supply station. We develop a mathematical formalism for handling requests for EV charging/discharging at EVSE based on queuing theory. Those models are evaluated while considering the mobility of vehicles in an urban scenario and time-of-use-pricing (TOUP).Finally, extensive MATLAB simulations are conducted to validate the proposed approach and demonstrate its effectiveness.

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SINGLE LOOP CONTROL OF A COMMON DC-BUS-CONFIGURED TRACTION MOTOR EMULATOR USING STATE FEEDBACK LINEARIZATION METHOD

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Abstract

Nowadays, the LCL (inductor-capacitor-inductor) filter is an integral part of every power electronic converter system operating on current control. Though higher order, the LCL filter due to its high harmonic suppression capability are widely adopted in back-to-back converter systems or grid connected converter systems. Normally, with LCL filter, the control system follows double closed loop with outer loop controlling DC voltage and inner loop controlling AC current. However, for some special applications like common DC-bus-configured motor emulator (ME) system, the DC bus voltage is not required to be controlled. In addition, the presence of LCL filter introduces cross coupling of flux and torque component in case of AC motor emulation. The double closed loop control is generally adopted to decouple torque and flux components, however the controller design is more complex process. Therefore, this paper presents a single loop control of a common DC-bus-configured ME system with LCL filter based on state feedback linearization method. The decoupling equations in direct and quadrature axis are derived here. The simulation results presented for a 2.0 kW PMSM motor validate the stability as well as closed loop operation of the system with single loop control.

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COMPARISON OF PEAK POWER TRACKING BASED ELECTRIC POWER SYSTEM ARCHITECTURES FOR CUBESATS

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Abstract

CubeSats have been widely used for space research due to lower cost and faster development. The electric power system (EPS) is one of the key subsystems of CubeSat which powers all the other subsystems. One of the important steps in the EPS design is the selection of EPS architecture which should be done considering overall efficiency, battery size, reliability, and simplicity of control. In the literature, a general comparison between different architectures is performed without considering the mission parameters, power generation profile, and load profile based on the operational modes. Thus, the best possible EPS architecture may not be selected in the design phase. Therefore, the main objective of this article is to develop a systematic methodology to compare various peak power tracking EPS architectures of CubeSat in terms of orbital efficiency for all possible modes of operation, component count, reliability, and battery size to meet the required number of cycles of charge/discharge for the given mission duration. The proposed methodology has been demonstrated using the real data and scenarios of MYSAT-1, which is a 1U CubeSat developed and launched by Khalifa University. The results demonstrate that EPS architecture with series-connected maximum power tracking converters for solar panels and unregulated dc-bus has the highest efficiency for all operating modes, lower component count, higher reliability, and minimum battery capacity or longer lifetime for the same battery specifications.

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A COMPACT EXPERIMENTAL DEVICE FOR THE STUDY OF TRANSIENT MODE IN ELECTRICAL CIRCUITS

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Abstract

Higher technical education has as its primary objective the transmission of theoretical knowledge of specialty but also practical activities whereby students acquire the habits and practical skills necessary for future engineering careers. The acquisition of practical abilities takes place during the laboratory classes during which the students can make experimental installations, to work with modern technical equipment, to collect and interpret experimental data. In this paper is presented a compact didactic use equipment designed for studying the transient mode in electrical circuits (charging/discharging of a capacitor, a R, L, C circuit operating powered by a rectangular signal source) realized on modern pedagogical principles that comes in support of students from the Faculty of Electrical Engineering in Craiova. Validation of the experimental device dimensioning accuracy was achieved by comparing the results obtained using the new experimental platform with the results obtained by computerized modeling using dedicated software.

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RESEARCH ON INTERTURN SHORT CIRCUIT FAULT LOCATION OF ROTOR WINDING IN SYNCHRONOUS ELECTRIC MACHINES

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Abstract

Rotor winding inter turn short circuit is the main fault of synchronous electric machines, it is of great significance to the safe and stable operation of the machine to discover and handle the fault timely. In view of this, the fault positioning method of rotor turn-to-turn short circuit of synchronous machines was studied. The mathematic expression of exciting magneto motive force (e-m.m.f.), electromotive force (e.m.f.) and current of stator were deduced. we analyzed the characteristic harmonic of e-m.m.f., stator e.m.f. and current caused by rotor winding inter turn short circuit; every harmonic amplitude variation of stator branch current was given in the relationship with rotor turn-to-turn short circuit. The different harmonic variation ratio of stator branch currents is only relevant to the position of the rotor inter turn short-circuit coil and has a one-to-one relationship, so the rotor inter turn short-circuit positioning method is presented. The method is verified by six-pole non-salient pole synchronous machines.

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A SEVEN SWITCH ALL IN ONE POWER ELECTRONIC TOPOLOGY FOR CONVERTED PLUG-IN HYBRID ELECTRIC VEHICLE

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Abstract

The paper presents a concept of seven switch power electronic topology capable of performing motoring, regeneration, plug-in charging and IC engine charging for converted plug-in hybrid topology. First, Integrated Converter act as charger reducing requirement of separate converter for charging with single phase charging functions (with the facility of three phase). Second, the same converter is used for charging the main battery when the internal combustion engine is running. Third, the same converter will act as an inverter in electric/hybrid electric mode supplying power to wheels through motor from the battery. Forth, the regeneration mode, the machine's phase windings energize the dc-link voltage i.e. battery through same converter act as a rectifier. The electrical energy flow within the drive train is controlled by a power electronic converter with less power switching devices and magnetic devices. During charging mode, the power converter and the machine phase windings are controlled with a three-phase magnetic contactor to enable the use of the ac–dc rectifier for charging the battery. It has the advantage of charging through IC engine at running and standstill condition. The passive power factor correction is used while plug-in charging mode, moreover optional active power factor correction for very high-quality input waveform and non-isolated grid charging is possible. Simulation results in MATLAB/Simulink validate the effectiveness of the proposed topology at different modes.

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ANALYSIS AND MODELING OF WIND TURBINE GENERATORS CONSIDERING FREQUENCY CONTROLS

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Abstract

A rapid increase in wind power installed capacities in many countries can potentially have an effect on their power grid dynamics, in particularly, on the system frequency stability. This is due to the fact that some basic wind turbine generator technologies such as doubly fed induction generator (DFIG), which is most commonly and widely used at present time, do not originally contribute to frequency response in a similar manner to conventional synchronous generators. Therefore, the frequency response feature of the DFIG-based wind turbine needs to be developed. In this paper, the frequency control for the DFIGbased wind turbine has been modeled using synthetic inertia and rotor speed control schemes, in which both controls are implemented according to the mathematic calculation. Then, the frequency response characteristics of the DFIG-based wind turbine associated with the individual control schemes and combined control schemes have been analyzed using MATLAB/Simulink. The simulation results indicate that the frequency response performance of the DFIG-based wind turbine can be enhanced by using the combined control schemes.

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CARDIOVASCULAR DISEASE EMPLOYING MACHINE LEARNING

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Abstract

For the most part, cardiovascular disease (CVD) refers to disorders that include narrowing or blocked veins, which can lead to a heart attack, chest pain (angina), or stroke. The condition is predicted by the machine learning classifier based on the state of the patient's side effect. The purpose of this research is to examine the presentation of Machine Learning Tree Classifiers in the prediction of cardiovascular disease (CVD). Random Forest, Decision Tree, Logistic Regression, Support vector machine (SVM), and K-nearest neighbors (KNN) were used to break down machine learning tree classifiers based on their precision and AUC ROC scores. The Random Forest Machine learning classifier achieved a greater precision of 85 percent, ROC AUC score of 0.8675, and execution time of 1.09 seconds in this study of cardiovascular disease prediction.

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ANALYSIS OF ELECTRIC POWER QUALITY

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Abstract

This paper deals with standard and legal requirements concerning electric power quality produced by wind power plants and with conditions under which electric energy transmission in the national electric power system can take place. The electric energy quality assessment is based on the case of Kamiensk Wind Power Plant and takes into consideration the following indices: variation in supply voltage, light flickering as well as distortion and asymmetry of voltage by higher order harmonics. Following the conducted measurements, it has been observed that the parameters of electric energy quality comply with current regulations in the Common Connection Point (CCP) of the power plant electric network with the public power system 110 kV.

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OPPORTUNITIES AND CHALLENGES OF VEHICLE-TO-HOME, VEHICLE-TO-VEHICLE, AND VEHICLE-TO-GRID TECHNOLOGIES

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Abstract

Electric vehicles (EVs) are regarded as one of the most effective tools to reduce the oil demands and gas emissions. And they are welcome in the near future for general road transportation. When EVs are connected to the power grid for charging and/or discharging, they become gridable EVs (GEVs). These GEVs will bring a great impact to our society and thus human life. This paper investigates and discusses the opportunities and challenges of GEVs connecting with the grid, namely, the vehicle-to-home (V2H), vehicle-to-vehicle (V2V), and vehicle-to-grid (V2G) technologies. The key is to provide the methodologies, approaches, and foresights for the emerging technologies of V2H, V2V, and V2G.

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NEW PV-FC-BASED AUTONOMOUS DC MICROGRID POWERMANAGEMENT METHOD

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Abstract

Solar energy is abundant in nature, and solar PV cells can simply convert it to electricity. Because a fuel cell is both dependable and environmentally safe, it is an excellent backup option for compensating for constantly changing solar irradiation. This study proposes simple control techniques for the DC microgrid's power management, which includes PV modules and fuel cells as energy sources, as well as a hydrogen electrolyze system for storing the extra power generated. When unexpected swings in input power and load demand occur, the super capacitor bank is employed as a short-term energy storage device to provide an energy buffer. For a hydrogen storage system, a novel power control approach is designed. The system's performance is evaluated with and without the super capacitor bank, with the results compared. The controller of the super capacitor bank, implemented using a classical PI controller and an intelligent fuzzy logic controller, is compared to the voltage regulation of the micro grid.

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HYBRID ENERGY FOR REMOTE ISLANDS FROM PEOPLES INDEPENDENT POWER PRODUCERS

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Abstract

The main challenge of producing electrical energy in Remote areas is, the sources of energy. The inefficient diesel power plant with huge costs of production is still the widely used alternative to meet the energy demand in Remote Area. In some areas PLN only able to supply 6-hour electricity every day with 220 Volt Grid. One of the solutions to reduce cost of production and capability to supply 24-hours electricity is using Renewable Energy, The feasible solution to solve this problem is to accommodate energy from privately managed power producers that can produce energy with a Smart Grid. PLN buys their electrical power according to the specific regulations (the lower price than basic electricity tariff, certain percentage of energy which can be bought from independent energy generator, a specific brand for energy generators) and PLN could sell the energy depending on renewable energy capacity installed and the use of a tool named switcher. Its main purpose is to limit the amount of energy that the customers can consume. It can switch the availability of electricity at night using Diesel Power Plant, renewable energy during the day and using battery to smooth and switch the system when there is intermittence. Thus, despite limited power generation, energy supplies are sufficient during the daytime, Renewable energy itself reduce system cost of production and low capital for PLN because due to usage of Peoples IPP.

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POWER SPLIT HYBRID TRANSMISSION SYSTEM

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Abstract

The Hybrid Electric Vehicle plays the key role in the energy saving and carbon emission reduction. Typically, an HEV combines two power components, an Internal combustion engine (ICE) and an electrical motor. The large capacity lithium or the Ni-MH battery is also needed. The power-split power train configuration of an HEV has the individual advantages of the series and parallel types of HEV power train configurations. The planetary gear set (PGS) plays the key role in it. In this paper, we are aiming to vary the parameters like Battery Electrical losses, Torque, Gear Ratio and Vehicle speed.

In this test result, Battery performance is analyzed by varying the Vehicle speed, Performance of motor Traction Torque was varied, which maintains constant speed and then decelerate back to the original speed to maintain transmission efficiency. The battery power management strategy based on a planetary gearset that can prevent the motor loss maneuver, the engine delivers the constant power required to maintain the original speed. Transmission efficiency and Battery performance are maintained in the proposed Hybrid transmission system.

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ANALYSIS, DESIGN, AND IMPLEMENTATION OF ASINGLE-STAGE MULTIPULSE FLEXIBLE-TOPOLOGY THYRISTORRECTIFIER FOR BATTERY CHARGING IN ELECTRIC VEHICLES

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Abstract

With the widespread growth in the use of electric vehicles (EVs), there is an urgent demand for fast-charging battery charger so as to alleviate the range anxiety for car users. A novel multi pulse flexible-topology thyristor - based rectifier (mPFTTR) is proposed in this paper, which can be a suitable candidate for high power fast-charging battery charger of the EVs. The proposed architecture has five operating modes: Series mode with 24 pulses (SM24P), parallel mode with 24 pulse, hybrid modes with 24 pulses (HM24P), series mode with 12 pulses, and parallel mode with12 pulses. To meet the practical requirement of fast charging, the predictive current control strategy combined with multi step constant current charging (MSCCC) is also proposed and followed by the detailed implementation and analysis. Simulation and experimental verifications are carried out, and both results show that the predictive current control strategy combined with the MSCCC method can charge the EVs with wide-range input voltage, and fast charging is also achieved. Finally, efficiency evaluation and comparisons of total harmonic distortions of the input current are developed between the proposed mPFTTR which operates in HM24P and the conventional thyristor-based rectifier that operates in SM24P.

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A NOVEL SMART LOCK DEVICE WITH MULTISTAGE-MULTIMODE SECURITY INTEGRATION

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Abstract

In general, the traditional or smart locks are single staged as well as external visible device so there is a maximum chance for trespasser to damage (Physical or Hacking) the locker system. The proposed paper is a prototype of Novel Smart Lock device, which is a high secured compact device with mandatory of Internal (Secondary Stage) and External (Primary Stage) security verification. The Primary Stage is having a Primary Door (sliding door) with its operating security modules visible for external access and the Secondary Stage is having a Main Door along with its smart security verifying modules kept internal to the Primary Door. To design this model RFID module and Bluetooth HC05 modules are used as Primary Stage Security System (PSSS), Fingerprint Scanner and Voice Recognition modules are used as Secondary Stage Security System (SSSS). However, the Primary Door is accessed by a proper Authentication of any one module in the PSSS and the Main Door is accessed by its successful Authorization of any one module in the SSSS. Therefore, when we want to access the Main Door, we must pass our credentials at Primary Stage as well as at Secondary Stage, then only we can access the actual door lock system. Hence the proposed solution is a high secured door lock device, and it completely controls unauthorized access of trespassers or hackers at its under limits.

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CERTAIN ANALYTICAL ASPECTS OF POWER SYSTEMS IN THE PRESENCE OF FACTS CONTROLLERS - SVC AND TCSC

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Abstract

The power flow problem consists of the calculation of power flows and voltages of a network for a specified terminal or bus conditions. Power flow calculations are performed in power systems for planning, operational planning, economic scheduling, and operation/control. Power flow equations, commonly referred to as power flow are the backbone of power system analysis and design. The power system analysis and design is generally done by using power flow analysis. Newton-Raphson's (NR) method is one of the methods which are used for getting the power flow calculations in an effective way. The characteristics and performance of transmission lines can vary over wide limits mainly dependent on their system. Hence, the NR method is used to maintain an acceptable voltage profile at various buses with varying power flow. The objective of this paper is to develop a MATLAB program to calculate voltages, active, reactive power and losses in a given systems and to analyze the results for wide load variations, different transmission line parameters in the presence of compensators SVC and TCSC. The comparison is presented for IEEE-14 and IEEE-30 bus test system with supporting numerical and graphical results.

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COMPARISON OF PATH TRACKING AND TORQUE-VECTORING CONTROLLERS FOR AUTONOMOUS ELECTRIC VEHICLES

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Abstract

Steering control for path tracking in autonomous vehicles is well documented in the literature. Also, continuous direct yaw moment control, i.e., torque-vectoring, applied to human-driven electric vehicles with multiple motors is extensively re- searched. However, the combination of both controllers is not yet well understood. This paper analyzes the benefits of torque- vectoring in an autonomous electric vehicle, either by integrating the torque-vectoring system into the path tracking controller, or through its separate implementation alongside the steering con- troller for path tracking. A selection of path tracking controllers is compared in obstacle avoidance tests simulated with an experimentally validated vehicle dynamics model. A genetic optimization is used to select the controller parameters. Simulation results confirm that torque-vectoring is beneficial to autonomous vehicle response. The integrated controllers achieve the best performance if they are tuned for the specific tire-road friction condition. However, they can also cause unstable behavior when they operate under lower friction conditions without any re-tuning. On the other hand, separate torque-vectoring implementations provide a consistently stable cornering response for a wide range of friction conditions. Controllers with preview formulations, or based on appropriate reference paths with respect to the middle line of the available lane, are beneficial to the path tracking performance

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EVALUATION OF WASTE HEAT RECOVERY OF ELECTRICAL POWERTRAIN WITH ELECTRO-THERMALLY COUPLED MODELS FOR ELECTRIC VEHICLE APPLICATIONS

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Abstract

The mile range of an electric vehicle (EV) may be reduced significantly in cold weather owing to the energy demand for meeting thermal comfort in the vehicle cabin, as waste heat from a combustion engine is not available for this purpose. Various heat pump-based heating, ventilation, and air conditioning (HVAC) systems can be employed to absorb the heat energy from the surroundings and/or the waste heat from the electrical powertrain to facilitate cabin thermal comfort, thereby extending the EV mile range. However, there is a lack of research on the electro-thermally coupled modeling and evaluation of the thermal performance of HVAC systems. This paper proposes electro-thermally coupled models for the electrical machine and inverter by modeling the key electromagnetic quantities as functions of the torque and speed based on offline parameter extraction from two-dimensional electromagnetic finite element analysis. The proposed electro-thermally coupled models, which are computationally efficient, are integrated into HVAC thermofluid simulation. Comparative studies of three heat pump-based HVAC architectures (conventional ambient heat only, waste heat only, and dual heat source) are performed using the proposed electro-thermally coupled models. The dual heat source HVAC architecture exhibits superior thermal performance over it counterparts in cold weather conditions

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EVCHAIN: AN ANONYMOUS BLOCKCHAIN-BASED SYSTEM FOR CHARGING–CONNECTED ELECTRIC VEHICLES

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Abstract

Purchases of electric vehicles have been increasing in recent years. These vehicles differ from traditional fossil-fuel-based vehicles especially in the time consumed to keep them running. Electric-Vehicle-charging Service Providers (EVSPs) must arrange reasonable charging times for users in advance. Most EVSP services are based on third-party platforms, but reliance on third-party platforms creates a lack of security, leaving users vulnerable to attacks and user-privacy leakages. In this paper, we propose an anonymous block chain-based system for charging-connected electric vehicles that eliminates third-party platforms through block chain technology and the establishment of a multi-party security system between electric vehicles and EVSPs. In our proposed system, digital certificates are obtained by completing distributed Public Key Infrastructure (distributed-PKI) identity registration, with the user registration kept separate from the verification process, which eliminates dependence on the EVSP for information security. In the verification process, we adopt smart contracts to solve problems associated with centralized verification and opaque services. Furthermore, we utilize zero-knowledge proof and ring-signature superposition to realize completely anonymous verification, which ensures undesirability and enforceability with no detriment to anonymity. The evaluation results show that the user anonymity, information authenticity, and system security of our system fulfill the necessary requirements

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A NOVEL CONTROL STRATEGY FOR DOUBLY FED INDUCTION GENERATOR IN MICRO-GRID WITH SUPER CAPACITORS

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Abstract

Due to the fact that the micro-grid system based on doubly fed induction generator driven by wind turbine is liable to be effected by wind fluctuation and load variation, so that the output power from the generator is instable and the dynamic performance of the micro-grid system is poor. This paper presents a novel control strategy for doubly fed induction generator in micro-grid with super capacitors. Considering the control characteristic of grid side power conditioner, rotor side voltage source converter and DC link in micro-grid system, the super capacitor is chosen as energy storage unit, then the transient performance of the generator is improved and the output power fluctuation is restrained. The simulation results verify that this method can enhance the operation performance of the micro-grid effectively and provide high quality power supply for various load.

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DESIGN AND ANALYSIS OF HYBRID CONVERTER

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Abstract

Previously hard-switching was employed in most DC-DC converters. The hard-switching operation of circuit experiences stress, conduction and switching losses to the device. Any power convertor circuit must consume the lowest amount of electrical energy and be able to turn on and off with the least loss. So, it becomes essential to scale back such conductivity losses. These issues are solved by combining "zero voltage switching (ZVS) and zero current switching (ZCS)". In this technique, a power switch is used to turns on and off at zero voltage and zero current respectively. This paper presents a generalized plan for the designing and implementation of a 'Hybrid converter' with a soft switching method to conquer the negative aspects found in hard-switching based converters.

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COORDINATED ROBUST CONTROL OF DFIG WIND TURBINE AND PSS FOR STABLILIZATION OF POWER OSCILLATIONS CONSIDERING SYSTEM UNCERTAINIES

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Abstract

Uncertainties in power systems, such as intermittent wind power, generating and loading conditions may cause the malfunction of power system stabilizing controllers, which are designed without considering such uncertainties. To enhance the robustness of stabilizing controllers against system uncertainties, this paper proposes a new coordinated robust control of doubly fed induction generator (DFIG) wind turbine equipped with power oscillation damper (POD) and synchronous generator installed with power system stabilizer (PSS) for stabilization of power system oscillations. Without the difficulty of mathematical representation, the inverse output multiplicative perturbation is used to model system uncertainties. The structure of POD and PSS is specified as a practical second-order lead/lag compensator with single input. The parameters optimization of POD and PSS is conducted so that the stabilizing performance and robustness of POD and PSS are augmented. The improved firefly algorithm is applied to solve the optimization problem and achieve the POD and PSS parameters automatically. Simulation study in the modified IEEE-39 bus New England system included with DFIG wind turbines ensures that the robustness and stabilizing performance of the proposed coordinated DFIG with POD and PSS are much superior to those of the conventional DFIG with POD and PSS under various severe disturbances and system uncertainties

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POWER SYSTEM CONTROL WITH AN EMBEDDED NEURAL NETWORK IN HYBRID SYSTEM MODELING

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Abstract

The output limits of the power system stabilizer (PSS) can improve the system damping performance immediately following a large disturbance. Due to non-smooth nonlinearities from the saturation limits, these values cannot be determined by the conventional tuning methods based on linear analysis. Only ad hoc tuning procedures can be used. A feedforward neural network (FFNN) (with a structure of multilayer perceptron neural network) is applied to identify the dynamics of an objective function formed by the states, and thereafter to compute the gradients required in the nonlinear parameter optimization. Moreover, its derivative information is used to replace that obtained from the trajectory sensitivities based on the hybrid system model with the differential-algebraic-impulsive-switched (DAIS) structure. The optimal output limits of the PSS tuned by the proposed method are evaluated by time-domain simulation in both a single machine infinite bus system (SMIB) and a multi-machine power system (MMPS)

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ANALYSIS OF THE IMPACT OF ELECTRIC VEHICLE CHARGING STATION ON POWER QUALITY ISSUES

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Abstract

Electric Vehicles use a battery pack to store energy that powers the motor. These batteries are charged by connecting the vehicle to an electric power source. These Electric Vehicles have a major impact on the power grid and distribution networks due to the effect of huge power demand to recharge their batteries. When an EV charging station integrates with the utility grid, it produces harmonics and affects the power quality. In this paper, the mitigation technique is examined to reduce power quality disturbances. Also, the impact of Electric Vehicle charging stations on distribution networks in terms of power demand, transformer power loss, voltage sag, and voltage swell is analyzed.

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RESEARCH ON COMMUNICATION TECHNOLOGY OF POWER MONITORING SYSTEM BASED ON MEDIUM VOLTAGE POWER LINE CARRIER AND LOW POWER WIDE AREA NETWORK

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Abstract

The Power Line Carrier (PLC) communication makes full use of the power line which has already been laid as the transmission medium and does not require earthwork construction and communication line laying, which can achieve rapid construction. While the wireless communication technology provides a good solution to solve the problems of high cost, poor flexibility and difficult installation and maintenance of wired communication technology. In this paper, based on the combination of medium voltage power line broadband carrier communication technology and Low-Power Wide Area Network(LP-WAN), proposes a communication technology of remote power monitoring system combined with wired and wireless, which can achieve real-time communication of power system with low cost and long distance.

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GENERATION OF ELECTRICITY USING PEDALING TECHNOLOGY

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Abstract

It is known that the supply of fossil fuels is inadequate and their usage as an energy source causes environmental degradation, and the world population increasing day by day and also the energy demand is increasing day by day, so it leads to a search for new renewable energy sources. Ecological friendly power and cleanliness are requested far and wide today. The main objective of this document is to utilize the human energy that is lost in pedaling and transform it into a useful form that is electricity. As per the recent survey we have got to know that some of the rural areas have been unelectrified, so we have come up with a solution called Generation of electricity using pedaling technology by which mechanical energy is converted to electrical energy. So this pedaling technology helps as an alternative power supply for electronic gadgets like laptops, mobile phones, etc.

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A DRIVE TRAIN INTEGRATED DC FAST CHARGER WITH BUCK AND BOOST FUNCTIONALITY AND SIMULTANEOUS DRIVE / CHARGE CAPABILITY

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Abstract

Electric vehicles have the potential to change the global driving paradigm, significantly reducing the environmental impact of transportation systems. However, charging infrastructure cost and range anxiety impose challenges on rapid technology adoption. This paper proposes an onboard integrated dc charger, leveraging the traction inverter, and motor winding inductance to ensure the minimum incremental mass. The proposed circuit allows the vehicle to connect directly to emerging dc microgrids, utility storage, or renewable energy resources. The system is compatible with power supply voltages higher or lower than the vehicle battery, offering the possibility to charge400-V batteries from emerging 1000-V supplies, as well as 800-Vbattery from the existing 600-V dc interfaces. The presented method also provides bidirectional fault blocking capability and bidirectional power transfer, suitable for V2G, G2V, orV2V operation. In addition, this paper proposes simultaneous driving and charging, especially useful for semitrailer trucks applications, significantly increasing operational range. The solution presented in this paper offers a simple and safe charging scheme with the potential to substantially reduce charging infrastructure cost and address range anxiety.

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SMART SENSORS BASED ASSISTIVE SYSTEM FOR THE VISUALLY IMPAIRED PEOPLE USING ARTIFICIAL INTELLIGENCE

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Abstract

The need for developing a low-cost assistive system for the visually impaired and blind people has increased with steady increase in their population worldwide. The stick system presented in the paper uses artificial intelligence along with various sensors in real time to help the visually disabled people to navigate their environment independently. Image recognition, collision detection and obstacle detection are the three tasks performed by the system. The image recognition task was performed using a smartphone application powered by artificial intelligence. The tasks of collision detection and obstacle detection utilized ultrasonic sensors to alert the user of the obstacles appearing in his route. The stick system also managed to demonstrate the important characteristics of affordability, high efficiency, mobility and ease of use.

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FUTURE IOT ADVANCEMENTS WITH ARTIFICIAL INTELLIGENCE ENABLED SMART SENSORS

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Abstract

Sensors play a vital role in our daily lives and are an essential component for Internet of Things (IoT) based systems as they enable the IoT to collect data to take smart and intelligent decisions. Recent advances in IoT systems, applications, and technologies, including industrial Cyber-Physical Systems (CPSs), are being supported by a wide range of different types of sensors based on artificial intelligence (AI). These smart AI-based sensors are typically characterized by onboard intelligence and have the ability to communicate collaboratively or through the Internet. To achieve the high level of automation required in today's smart IoT applications, sensors incorporated into nodes must be efficient, intelligent, context-aware, reliable, accurate, and connected. Such sensors must also be robust, safety- and privacy-aware for users interacting with them. Sensors leveraging advanced AI technologies, new capabilities have recently emerged which have the potential to detect, identify, and avoid performance degradation and discover new patterns. Along with knowledge from complex sensor datasets, they can promote product innovation, improve operation level, and open novel business models. We review sensors, smart data processing, communication protocol, and artificial intelligence which will enable the deployment of AI-based sensors for next-generation IoT applications

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LINE-START PERMANENT MAGNET SYNCHRONOUS MOTOR STARTING CAPABILITY IMPROVEMENT USING POLE-CHANGING METHOD

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Abstract

Line-start permanent magnet synchronous motor has many advantages, but it has two important defects are poor starting torque and synchronization capability. This paper presents a pole-changing of line-start permanent magnet synchronous motor which has a 6/8 pole-changing stator winding. A new structure of stator winding is designed to realize pole-changing. This motor can eliminate braking torque and pulsating torque at start-up effectively and improve the motor's starting capability significantly. The two-dimensional (2D) finite element method (FEM) is implemented to design and analyze the motor. The results show that pole-changing line-start permanent magnet synchronous motor at start-up can significantly improve the motor's starting performance.

ABOUT CONFERENCE

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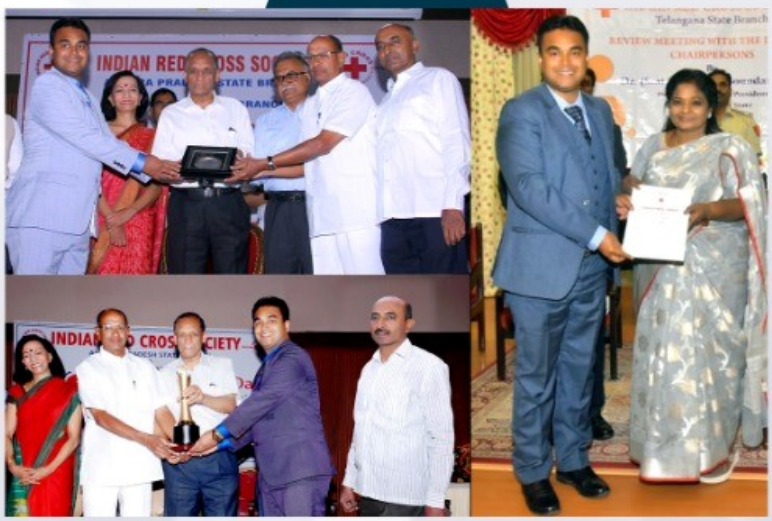

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