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A Novel Method for Dynamic Stability Enhancement of SMIB System

P. Amrutha, C. Srinivas Rao & M. Vijaya Kumar

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Abstract

This paper proposes a novel method (PSOMSF) to unified power flow controller (UPFC) for dynamic stability enhancement of single machine infinite bus system (SMIB). This method consists of multi stage fuzzy damping controller and particle swarm optimization (PSO) method used for fixing the fuzzy bounds. Two stages of fuzzy controllers are designed in such a way the first fuzzy controller exhibits PI behavior and second fuzzy controller

Solid State Technology

Dynamic Stability Enhancement Of Smib System With Gapod Controller Based Upfc

Amrutha P, Srinivasa RaoC, Vijaya Kumar M

Abstract

This paper proposes a combination of Genetic Algorithm based Power Oscillation Damping (GAPOD) and DC Voltage Regulator (DCVR) controllers are proposed for Unified Power Flow Controller (UPFC) for the enhancement of dynamic stability of single machine infinity bus (SMIB). The difference between mechanical power and electrical power is the input to the GAPOD, and the output of GAPOD is connected to UPFC. GA tunes the parameters of POD ana DCVR by minimizing the error; this error is the difference between mechanical and electrical power. The proposed method is applied to SMIB in MATLAB/Simulink environment, and results compared with Particle Swarm Optimization based multi stage DC voltage controller (PSOMSFDCVR) at different loading conditions.

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Articles

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Reduction of Steady State Ripple of Vector Controlled Induction Motor Drives by Combining the Techniques of FOC and DTC

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ABSTRACT

To reduce the disadvantages of the existing Methods of field oriented control and direct torque control algorithms, the proposed method of the vector control algorithm mix the ideology of mutually field oriented control as well as direct torque control. The proposed algorithms generate the d-axis plus q-axes current references with the theory of existing field oriented control. As a result, by evaluate the current references as well as the actual currents error present signal is produced. As a result of with the error signals along with the lookup-tables, and the appropriate voltage vector will be chosen based on the theory of the direct torque control. Hence, the proposed method reduces the complexity when evaluated through the field oriented control as well as decreases the stable condition of the torque swells, when evaluate with the direct torque control method. So In this article, propose a 6-sector, 12-sector and 24-sector based lookup-tables designed for the vector control algorithm. The Mat-Lab-simulation results are exhibits the efficiency of the proposed techniques.

Keywords
Direct Torque Control (DTC), Field Oriented Control (FOC), vector control algorithm, lookup-table.

I. INTRODUCTION

In the present days asynchronous motors are uses in variable-speed drives appliance because of with a reduction of maintenance as well as lesser weight to volume proportion. So many existing algorithms are developed for the speed-control of motor drives. One of the existing algorithms is the scalar control, and also identified as the volts/hertz control method is easy for the execution. But, the main disadvantage of the scalar control offer slow reaction due to the coupling consequence flanked by the torque along with flux. To attain the decoupling controller in asynchronous motor drive related to the separately excited dc motor method, FOC method, and also known as vector based control method have been proposed [2]. The development of the field oriented control brings resumption in the field of the ac related drives. Afterward, a lot of enhancements have been proposed for the field oriented control [3]-[5]. The field oriented control offers quick transient response due to the decoupled control of torque as well as flux. Although, the field oriented control provides high-quality transient retort, the complexity taken addicted to more due to the revolution of reference framework.

To reduce the complexity worried in field oriented control (FOC), in the year 1980s, Takahashi expand proposed DTC method for motor drives [6]. The direct torque control (DTC), is simple for the suitable performance as well as it sprightly control the mutually torque as well as flux. It utilizes two hysteresis types of comparators designed for torque as well as flux loops along with a lookup-table for the selection of right voltage vector Method. However, the direct torque control method provides quick dynamic reaction related to that of field oriented control method, it presents massive stable condition deviation in current values, torque characteristics, and flux characteristics. A total evaluation involving field oriented control method as well as direct torque control method has been presented [7]. Additionally, the advantages and disadvantages of field oriented control method as well as direct torque control method are discussed. To reduce the complexity concerned in current controlled drives suitable to the transformation of reference framework, a

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Simulation of Solar cell Based Multilevel Inverter for Induction Motor Applications

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ABSTRACT

The RES systems like wind Renewable energy sources, solar Renewable energy sources along with Energy obtained from water source are observed as a dependable substitute to the Existing energy resources like oil, natural gas and coal. Distributed Electrical Transmission method is depended on RES undergoes large scale growth across the world. As a Result, the control of distribution generation scheme should be enhanced to satisfy the necessities for grid interconnection. This paper explains the growth of a control design in favor of grid tied inverters of RES. In this proposed concept HCC controller is used as a controller of the system. In the proposed controller the inverter with Induction Motor drive Load current is essential towards the allow the grid connected voltage in provisions of the regular intervals of the time. The Ig is calculated, along with contrasted through the Ir is in form of the unit sine waveform attained as of the grid along with the sine-pulses are produces the error among the authentic current and the grid of Load current. And the delivered power of the grid is increased as the Direct Current linkage of the voltage also increases. The converter will be experienced on grid interface on the rotor surface of an induction Motor generator. The Proposed technique is fed to a induction motor drive as well as the shows the motor speed characteristics, Torque characteristics and Stator Current characteristics is analyzed by using Matlab/Simulink software.

Keywords
Renewable energy sources (RES), Hysteresis Current Control (HCC), Distribution Network, Induction Generator, Reactive Power, Harmonics, and Power Quality.

I. INTRODUCTION

In the last few years, Inverters (MLI's) has gain consideration due towards the broad appliance in distributed systems along with the Industrial Motor drives. The improved sinusoidal sine waveform of the ac output commencing dc resources similar to batteries, Photovoltaic cells. Etc is to be attaining from Multi-Level Inverters. In the ac output be able to directly interface towards the load through the little filter circuits is in the output [1].

In the stairway waveforms are able to produce from several input DC supply feed toward a Multi-Level Inverters. Multi-Level Inverters' stair waveforms depict an improved harmonic report. The main limits of Multi-Level Inverters are constraints of huge No. of Switches are used along with connected driver circuits. Now a day's Electricity is widely used in everywhere in the world. So the applicants are want to be used Quality Power. There are several types of energy's are available in the world. Electricity is the basic need of the people, which is used as household purposes, industrial applications and Domestic applications. Renewable Energy sources are used for generation of the Electricity because of Free Environment and for future generations. In solar Photovoltaic method is one of the finest techniques is to produce Electricity. In recent developments photovoltaic (solar) has to be delivering the constant power than moreover entity supply.

In Distribution systems, the supply of the primary consumers is to be resolved with the economical conditions, eco-friendly, improvement of Power quality and the high reliability conditions. So in this paper we developed a generation system with the combination of fuel cells, solar cell and also backup with the battery Banks. And the definition of the generating systems in distributed Generation is a supply of little electrical power is linked to a network or circuit. Industrial development now allows Electrical power system to be built in less essential amount through far above the ground efficiency, economical, and Eco-friendly. In the Electrical Power electronics have misused quickly through the last thirty years as well as the number of requests has been rising, essentially suitable toward the growth of the semiconductor devices as well as the microprocessor. A summary of dissimilar power strategies as well as the region where the expansion is still obtainable on is shown in Figure.1 [1]. The fed of the voltage source converter drives are

Reduction of Steady State Ripple of Vector Controlled Induction Motor Drives by Combining the Techniques of FOC and DTC

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ABSTRACT

To overcome the drawbacks of vector control and direct torque control algorithms, the proposed vector control algorithm combines the principles of both F.O.C and D.T.C. The proposed vector control algorithm generates the d- and q-axes reference currents by using the principle of conventional F.O.C control. So, by compare the reference currents and actual currents error current signals are generated. By using the error signals and lookup tables, the suitable voltage vector will be selected based on the principle of DTC.Thus, the proposed technique decreases the difficulty when compared with the FOC and reduces the steady state torque ripple when compared with the DTC. In this paper, 6, 12 and 24 sector based lookup tables are proposed for the vector control algorithm. The simulation results are exhibited the effectiveness of the proposed techniques.

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ANovelMethodofThreePhaseSevenLevelCHB Inverter for Industrial Applications

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ABSTRACT

In this paper a modified switching pattern for 7 level cascaded H Bridge inverter is presented. Basically inverter is a device that converts DC power to AC power at desired output voltageandfrequency.Demeritsof inverterarelessefficiency,highcost,andhighswitchinglosses. To overcome these demerits, we are going to multilevel inverter. Though the multilevelinverters hold attractive features, usage of more switches in the conventional configurationposesalimitationtoitswiderangeapplication.Cascadedmultilevelinverterhasthe advantage of most reliable and to achieve the best fault tolerance owing to its modularity; a feature that enables the inverter to continue operating at lower power levels after cell failure. Modularity also permits the cascaded multilevel inverter to be stacked easily for high powerand high voltage applications. Therefore, a renewed 7-level multilevel inverter topology is introduced switching pattern of cascaded H bridge inverter topology is analyzed throughthermal module of power electronic switches thereby ensuring the minimum switching losses, reducing size and installation cost. The proposed inverter provides higher output quality with relatively lower power loss with the induction motor drive. The performance and results are evaluated by using Matlab/Simulink software.

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Recent Trends in Smart Meter technology

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ABSTRACT

An electric utility company requires proper infrastructure for the deployment of power to consumers. The successful operation of any electric utility company depends upon the measurement of consumption of energy of the consumers and also depends upon the communication between utility and consumer. The smart meter is a key component in the smart grid. It measures and records the consumption of energy and also provides bi-directional communication between consumers and the utility company. It consists of several sensors and control devices and is supported by faithful infrastructure. The smart meter improves the reliability, quality, and security of supply. This paper describes the important characteristics and functions of smart meter technology. It also discusses the working, benefits, and challenges involved in the implementation of smart meters

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PERFORMANCE EVALUATION OF SOLAR AND WIND CO-GENERATION BASED MULTI-PURPOSE STATCOM FOR POWER-QUALITY ENHANCEMENT USING FUZZY-LOGIC CONTROLLER.

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ABSTRACT: Now-a-days the electric power system faces many disturbances due to sudden interruptions coming from loads and also attains greater power quality features due to highly usage of non-linear loads. So, there is a requirement to restrict these sudden interruptions and mitigates the power quality issues. The distributed generation scheme with integration of renewable energy sources furnishes the feasible solution to acquire the stable power demand in grid-connected system under sudden load interruptions. Over the various compensation devices, the highly recognized multi-purpose Static Compensator is integrated to grid for attaining enhanced power quality features. A co-generation based grid-integrated renewable sources are used but, the output of these sources are maintained un-constant due to presence of variable source. In this paper, a novel current controller was developed to maintain output of co-generation system as constant and achieve the load demand continuously. But, the proposed current controller pre-requisites the traditional PI controller, which is controlled by intelligent based Fuzzy-Logic controller is adopted. The performance evaluation of proposed Multi-purpose Static compensator is verified by traditional PI and proposed Fuzzy-Logic based current controller by using Matlab/Simulink tool and results are conferred with comparisons.

Key words: PI controller, Fuzzy-Logic controller, Static Compensator

(1) Introduction

The growth of global population, increased utilization of power-electronic devices which consumes electrical energy and demand of electrical energy has been extended to unpredicted levels. In present scenario, the electrical energy has been diminished due to limited fossil fuels, social, environmental and geographical issues [1], [2]. To fulfill these issues, several attempts have been constituted to meet the energy demand natively through Distributed Generators (DG's) [3]. The incredible establishment of DG scheme provides the greater energy demand, clean energy, sustain the stable real-power exchanging under sudden-load variations with the help of Renewable Energy Sources (RES) [4], [5]. Several renewable sources are Wind-Turbine (WT), Fuel-Cell (FC), Solar-Photovoltaic (SPV) systems, which are directly interfaced to grid system by employing power-conditioner systems. Harnessing the electric energy from SPV system furnishes the clean energy, extensive nature in present climatic situations, pollution free, long life, greater efficiency characteristics are the key merits of SPV system.

Over the single sourced DG scheme, two and/or more RES's are integrated as hybrid formation called as co-generation system for maintaining continuous load demand; eliminate the sudden changes, etc. Generally, the output of SPV is very low in nature and are integrated to PCC/load with the accomplishment of high-voltage gain DC-DC boost converter and DC-AC Voltage-Source Inverter (VSI) is utilized with attractive control objective. Many industrial and domestic appliances utilize the power-electronic converters, which leads to poor power-quality standards in grid-connected system. Severe economic-technical impacts are greatly experienced because of current and/or voltage imperfections at PCC level [6]. These concerns are frequently appeared due to presence of

IOT based Underground Cable Fault Detection and protection using ESP 8266 NodeMCU

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Abstract:
The electrical cables run in underground instead of overhead lines in Urban areas. The main purpose of the project is to detect the location of fault in the underground cable. The main objective of this paper is to determine the location of fault in underground cable lines from the source station to exact location of fault in any units, here in kilometres. Underground cables are prone to a wide variety of faults due to underground conditions, wear and tear, rodents etc. Diagnosing the fault source is difficult and entire cable should be taken out from the ground to check and fix faults. The project work is intended to detect the location of fault in underground cable lines from the base station in km using a ESP8266 NodeMcu controller. Whenever the fault occurs in underground cable it is difficult to detect the exact location of the fault for process of repairing that particular cable. The proposed system finds the exact location of the fault using GPS. So that we are using the Node MCU Microcontroller, GPS and Wifi device to find the fault easily and accurate. We tend to use IOT technology that permits the authorities to observe and check faults over the web.

Keywords: ESP8266 Node MCU Microcontroller, Current sensor, Relay driver, GPS, Arduino IDE, Embedded C, Blynk App

(1) Introduction:

A variety of technologies and tests are currently available to evaluate underground cable faults. There is often little correlation between the diagnostic results and the actual deterioration[1]. The failures of underground power distribution cables represent a serious threat. Presently diagnostic techniques require cable to be disconnected from the grid, causing service interrupted during locating the fault. The proposed system, help us to detect the exact fault location of the cable and fix by providing instant information about fault. In a electrical utilities, some of the transmission lines plays the major role of every power systems[2]. With regard to this, cost of power delivery, and accurate fault location for the transmission of electric lines is of vital importance in restoring the power services and reducing outage time as much as possible. By an accurate source detecting and finding the exact faults on high voltage transmission network is very important for all the utilities to allow a quick maintenance action for the concern authority of a repairing person or crew. Detecting the cable fault in the underground can be categorized as a open conductor faults, shorted faults, and high impedance faults, Which it may occur in the transmission lines.

1.1. Short Circuit Fault:

When two conductors of a multi-core cable come in electrical contact with each other due to insulation failure, it is called short-circuit fault. The two terminals of the megger are connected to any two conductors[3]. If the megger gives zero reading, it indicates short-circuit fault between these two conductors.

1.2. Proposed System:

Normally underground cables using transmits the power. If that cable gets any damage means we have to check to start to end. But in this project, we developed on the method we monitoring the cable in IoT If any damage will happen means the particular place find in IOT cloud

Optimal Placement and Sizing of IPFC hybrid Technique

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ABSTRACT

Utilization of the electrical power has increased by many folds in the last decade due to urbanization andconsumer behviour, it is not advisable to add a new line to the available power system network fornumerous reasons and worthy mention are regulatory, environmental and public policies andinstallation costs. to overcome this modern power electronics devices such as Interline Power FlowController (IPFC) are introduced into the system that can control one or more AC transmission systemparameters for enhancing power transfer capability and controllability . Sizing of the IPFC and locatingthe same in transmission line is a herculean task. To overcome this a new hybrid method using fuzzy logic(FL) and Artificial Bee Colony (ABC) algorithm is introduced. The use of fuzzy logic controller solves theproblem of sizing of IPFC in terms of voltage deviation and the problem of locating the IPFC is done byABC algorithm. The proposed method increases the voltage profile and reduces the transmission loss ofthe power system.

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Intelligent Smart Energy Saving System For Domestic And Commercial Areas

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ABSTRACT:

Power is the most important source for our day to day life. In the events of forgetting to switch off the lights and fans in the closed areas like offices, shopping malls, classrooms ect.. most of the power is being wasted. The main aim of the project is to save the electricity by controlling the lights and fans depending on the number of people in closed area.

To avoid this problem we considered Intelligent Smart Energy Saving System for domestic and commercial areas to save power. It automatically switch off all the lights and fans when there is no people in closed area and also controls the speed of the fan depending on the number of people in closed area.

Keywords: Arduino Nano, LCD, IR sensors, LED, PCB, Resistors ,Transistors, Switches Embedded C, Arduino IDE

1. Introduction:

We built an Automatic Room Temperature Control System Using Arduino based system which can automatically switch ON room lights and fan when at least one person is present in the room. If room is empty, the lights and fan will automatically get switch off. It also displays count of persons present in the room. Electricity is one of the most important resources in this century. We should conserve the electricity. But many times we come outside the room and forget to turn off the lights/fan, thus the electricity is wasted. To overcome this we are going to implement a project called “Automatic room light controller with bidirectional visitor counter”. This project has 2 modules. First module is “Bidirectional Visitor counter” and the other module is “Automatic room light controller”. Main concept behind this project is to measure and display the number of persons entering in any room like seminar hall, conference room. And when number of persons inside the room is zero, power supply inside the room can be cut using a relay interface. This will help to save electricity. LCD display placed outside the room displays number of person inside the room. Also if at all one wants to know the number of people present in room so as not to have congestion, this circuit proves to be helpful. We build this system using Arduino and IR sensor module.

1.1. Work Description:

- We have used two IR sensors one for detecting person entering into the room and
  other for detecting person leaving (exit) the room.
- Also these IR sensors are also used to count the person entering and leaving the room. This person counting will help to automate the room's fan and light. That means when the room is empty, the room's light and fan will remain off. But if someone enters the room then the room's light and fan will get turned ON automatically with person count displayed on LCD.

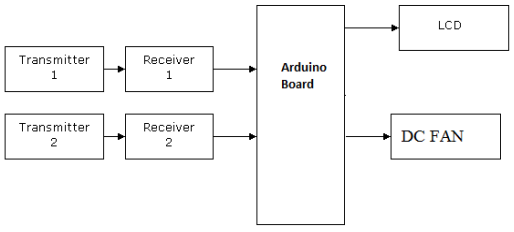

Fig.1. Block diagram of railway gate control system

EMBEDDED BATTERY MANAGEMENT SYSTEM

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Abstract:
This paper introduces a novel approach to battery management using Arduino Uno. It explains the working of Arduino in monitoring the performance of battery. We proposean Embedded Battery Management System (EBMS) that entirely decentralizesthe monitoring and control of the battery. The advantages over centralized EBMS, resulting in higher modularity,easier integration and shorter time to market for battery packs.Here the loads totally depend on the source of energy from a battery. The proposed battery monitoring system consists of two major parts i) monitoring device and ii) overload detection. Based on experimental results, the system is capable to detect degraded battery performance and display notification messages for further action.A development platform has been set up to design and analyze circuits and algorithms for EBMS. Design of an embedded battery management system with passive balancing. A central control board is designed to collect battery status information, analyze the obtained data and provide information to the end user.
Keywords: Arduino Uno, Voltage sensor, Current sensor, Battery,LCD display, Relay module

1. Introduction:

A battery management system (BMS) is any electronic system that manages a rechargeable battery (cell or battery pack), such as by protecting the battery from operating outside its safe operating area, monitoring its state, calculating secondary data, reporting that data, controlling its environment, authenticating it and / or balancing it.Nowadays, lithium-ion batteries are used in various applications, ranging from personal electronic devices, like cell phones, to the emerging class of electric vehicles. The BMS will also control the recharging of the battery by redirecting the recovered energy[1]. With the transition from fossil to regenerative energysources, as well as emerging Electric Vehicle (EV) and smartgrid markets, Electrical Energy Storages (EESs) are gaining importance. Different types of batteries are available in market. When compared to lead-acid, or NiCad batteries, a comparatively advanced monitoring is necessary for safe operation. The complexity of a battery management system (BMS) strongly depends on the individual application. In simple cases, like single cell batteries in mobile phones, or e-book readers, a simple “fuel gauge” Integrated Circuit (IC) can be sufficient. These ICs usually are able to measure voltage, temperature and current and use simple methods to estimate the battery’s current State of Charge (SOC). In more complex devices, like electric cars, the BMS has to fulfill more sophisticated tasks. While specific applications may require other Electrical Energy Storagessuch as supercapacitors or fuel cell systems, electrical energyis commonly stored in batteries that consist of electrochemicalcells[2]. These battery cells are performing a reversible chemicalreaction between their two electrodes, the positive cathode andthe negative anode. This allows to charge and discharge cellsmultiple times by the movement of ions between the electrodeswithin an electrolyte. Consequently, an electrical current isflowing if the electrodes are electrically connected.In addition, the basic parameters like cell voltage, cell temperature and current have to be measured.

ENERGY METER MONITORING OVER IOT

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Abstract:

We can see a person standing in front of our house from electricity board, whose duty is to read the energy meter and hand over the bills to the owner of that house every month. This is nothing but meter reading. According to that reading we have to pay the bills. The main drawback of this system is that person has to go area by area and he has to read the meterofeveryhouseandhandoverthebills and it is time taking process. To overcome this drawback we have come up with an idea which will eliminate the third party between the consumer and service provider, even the errors will be overcome. In this project the idea of smart energy meter using IOT and embedded system have been introduced. In this method we are using microcontroller because it is energy efficient i.e. it consume less power, it is fastest . In this project, energy meters which are already installed a tour houses are not replaced, but a small modification on the already installed meters can change the existing meters into smart meters. One can easily access the meter workingthroughwebpagethatwedesigned (in blink application). There we can see meter reading. Currentreading can be seen on web page which is located nearby substation.

Key words: ESP8266 Microcontroller, Energy Meter, LCD display, Relay, Arduino IDE

1. INTRODUCTION

Conventional energy meter which we use in our households to measure Energy consumption is an offline device, so it has to be monitored manually. But nowadays there are Smart Energy Meters available in the market whose readings can be monitored from anywhere using the internet and not only energy consumption but we can monitor multiple parameters such as voltage, current, etc. on laptop or mobile using IoT. IOT (Internet of Things) based smart energy meter is a type of energy meter that not only shift the consumer supply form one grid station to another grid station automatically, although also calculate the cost of their consumed energy. This whole work is done by this IOT based smart energy meter though internet browsing. Every energy company provides energy hundred and thousands of consumers through intermediate controlled grid station which are specified for a certain area. Sometimes the supply of this energy, to gird station is switched off or failed due to any emergency condition such as short circuiting or transmission line repairing then the whole area which relates to this grid station is affected. In order to reduce the human efforts and to make the life of human comfortable so many technologies are emerging day by day. Among those technologies Internet of Things (IoT) is one of the trending technology which allows the communication of nodes through internet in a network. IoT is a boom due to the rapid technological advancements in Wireless technology, sensor networks, and wireless communications, networking and cloud technologies. There are various applications of IoT such as smart farming, smart home, connected car, wearables, smart city, industrial internet, smart supply chain. A part from all these application the most important and focusable application in order to improvement energy efficiency and smart billing which avoids human intervention is smart grids.

2.BLOCK DIAGRAM:

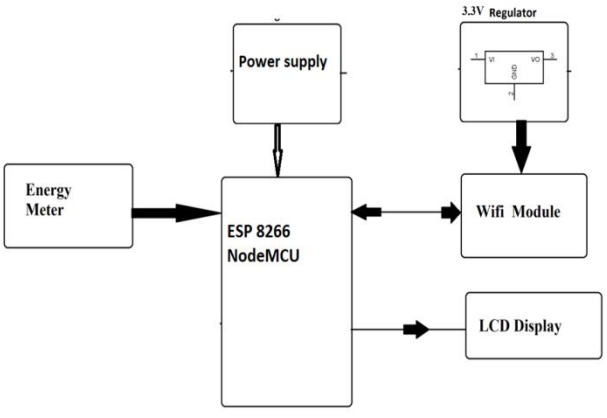

Fig 1: Block diagram

H-bridge Inverter based Power Line Conditioner of Voltage Balance Method

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ABSTRACT

Among the various multilevel inverters, cascaded multi level inverters are widely known for their many advantages like modularized circuit, requirement of less number of components as compared to other multilevel inverters and possibility of switching redundancy for inner voltage levels. For power conditioning applications a cascaded multi level inverter with capacitors can be used instead of dc sources. But the voltage balancing of dc capacitors is a critical problem. This paper presents an algorithm by which the capacitor voltages can be balanced significantly. The charging and discharging process of capacitor is dependent on the width of the output pulses.A mathematical model of H- bridge inverter based power conditioner is developed. Simulation has been carried out using MATLAB/ SIMULINK and the results are presented.

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Mitigation of Certain Power Quality Issues in Wind Energy Conversion System Using UPQC and IUPQC Devices

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Keywords:
improved unified power quality conditioner, power quality, wind energy conversion system, voltage sag, voltage swell

ABSTRACT

Due to limited conventional energy sources and to meet the increase of load demand there is a need for utilization of renewable energy sources. Among the all renewable energy sources wind energy is widely used and is highly sustainable as compared to other sources of energy. Many wind energy conversion devices working with doubly fed induction generators and synchronous generators and it is integrated to the grid produces the power quality issues like as voltage sags, swells, harmonics, voltage imbalance and short interruptions etc. Many power electronic based Flexible AC Transmission Systems (FACTS) are designed to solve above problems and facilitate to meet the required power demand. In this paper, UPQC (Unified Power Quality Conditioner) and IUPQC (Improved Unified Power Quality Conditioner) models are designed to mitigate the above power quality issues. In this paper, mainly voltage sags, voltage swells and harmonics are considered as a power quality issues to analyze the UPQC and IUPQC devices. The conventional PID controller is employed in control circuit of both the devices. It also discusses the comparative analysis between UPQC and IUPQC devices. The MATLAB/SIMULINK Software is used for above analysis.

1. INTRODUCTION

To meet the required load demand and decrease of fossil fuels, the conventional energy sources such as wind energy, solar energy, nuclear energy, fuel cell etc. are used for generation of electrical energy at generating stations. Among the all renewable energy sources the wind energy is one of the fastest development energy sources in worldwide. At present the wind energy is one of the major power suppliers to the distribution stations [1]. The total installed capacity of the wind power in India up to March 31st, 2019 was 36.625 GW. India is the fourth largest wind power capacity in the world. It expands across all the regions in India [2, 3]. Many issues are arises when the wind form is integrated to the power grid due to increase of nonlinear loads [4].

These issues are Capabilities of reactive power, Requirement of Power factor, Frequency and voltage ride-through capabilities, Impacts on base system conditions, Short circuit and stability effects, Voltage instability and Harmonics and flicker effects [5]. Hence, it is very important to mitigate the above issues. There are many power electronic based devices are introduced to reduce the power quality issues. Active Power Filters, Flexible AC Transmission Systems (FACTS) devices and Shunt capacitors etc., are comes under this category [6].

The authors of the paper [7] published the different power quality issues occurred in the distribution system and there corresponding mitigating techniques. In paper [8], the authors explained designing a fuzzy logic control based SSSC device that improves the stability of the system. The mitigation of power quality issues using Static Synchronous Compensator (STATCOM) is discussed in papers [9, 10]. Jadhao et al. [11] and Pei and Chen [12] explained the enhancement of power quality using UPQC device.

In this paper at first, UPQC model is developed for mitigating the different power quality issues. Later, improved version of UPQC known as IUPQC model is developed for mitigating the above power quality issues. Conventional PID controller is used for designing the control circuit for both the devices. MATLAB/SIMULINK Software is used for designing the models and to analyze the performance of devices.

In this paper, the concept of WECS and the proposed test system are discussed in section II, UPQC and IUPQC models and concept of conventional PID (Proportional Integral Derivative) controller are explained in section III, simulation results of with and without FACTS devices are discussed in section IV and finally in section V the conclusions of this paper is described.

2. DYNAMICS OF PROPOSED SYSTEM

The proposed test system is shown in Figure 1. It consists of two parallel transmission lines and they are connected to the grid. For analyzing the system first, voltage sag, voltage swell and nonlinear disturbances are created in the first transmission line by including the capacitor load, creation of three phase fault and non linear load at different time instants with help of circuit breakers [13]. This results the second transmission line also experiences the sag, swell and nonlinear disturbances at different instants, because both transmission lines are

TRAFFIC CONTROL SYSTEM

BY USING PROGRAMMABLE LOGIC CONTROLLER:

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ABSTRACT:

The paper deals with control of traffic lights by using PLC and SCADA.Trafficload is highly depended on parameters such as time,day,season,weather and un predictable situations suchas accidents .The control of traffic lights was performed by software and original relaywiring was replaced by program.The hardware and software resources of plc were usedreasonable. The system developed by setting the appropriate duration for traffic signals to react accordingly.The PLC checks the status of sensors.The system resolution depends on out put provided by sensors.The PLC checks the priorties and then provide output signal to traffic light polesto on or off.ON time is depended on specific priorties.

I. INTRODUCTION:

As we know that Traffic load is highly depended on parameters such as season ,weather, day time and unpredictable situations as accidents,constructionsactivities.these parameters are taken into accountinorder to prevent traffic control system to create bottlenecks and delays.These problems can be solved by continuous monitoring traffic conditions and adjusting the timingof traffic light signals according to the traffic load.An adaptive traffic control system must have the ability to diagnose saturation in system and function can be changed as desired.The older system uses trigger machine as weight now the current traffic system react to trigger the light changes.

The traffic signal control system consists of three important parts.The first one is hardware and the second one is PLC controller .The third one is sensor.The function of sensor is to detect the presence of vehicles.The traffic signals will have strength and weakness that must be considered while installing it.Signal intersection can reduce occurunce of collisions by turning traffic and cross traffic.Avariety of delay control system is used to accomplish ranging from simple clockwork mechanism to sophisticated computerized control and coordination system that self adjust to minimize delay to

people using the road.The main aim of designing and developing of traffic signal control system is to reduce the chances of accidents and reduce waiting time of each lane of cars.

PLC means PROGRAMMBLE LOGIC CONTROLLER in industrial control system that continuously monitor the state of input devices and make decisions according to program to control the state of output devices.Almost any production process can greatly enhance using this type control system.The main advantage of using PLC is to change and replicate the operation.Another advantage of PLC is it is modular i.e. you can mix and match type of input and output devices to best suit your application. A PLC is an industrial digital computer which has been ruggedized and adapted for the control of programming and process fault diagnosis.

II. LITERATURE REVIEW:

C Barz et…[1] al; presents the traffic control system controlled through a PLC which takes the signals from different sensors on roads. The global system developed ensures the coordination of four intersections, setting a path that respects coordination type green light, the integration of additional sensors, the implementation of probes radar to inform traffic participants about recommended speed for accessing the green state located in the intersection that will follow to cross.

Ashwini Y Dakole et…[2] al; The new architecture and design theory of this system is integrated by lot

Wind Farm to Weak-Grid Connection using UPQC as a Custom Power Device

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Abstract—
Wind Farms (WF)employingsquirrelcageinduction generator (SCIG) directly connected to the grid,represent alargepercentageofthewindenergyconversion systems aroundthe world. In facilities with moderated power generation, the WF are connected through medium voltage (MV) distribution headlines. A situation commonly found in such scheme is that the power generated is comparable to the transport capacity of the grid. This case is known as Wind Farm to Weak Grid Connection, and its main problem is the poor voltage regulation at the point of common coupling (PCC). Thus, the combination of weak grids, wind power fluctuation and system load changes produce disturbances in the PCC voltage, worsening the Power Quality and WF stability. This situation can be improved using control methods at generator level, or compensation techniques at PCC. In case of wind farms based on SCIG directly connected to the grid, is necessary to employ the last alternative. Custom power devices technology (CUPS) result very usefull for this kind of application. In this paper is proposed a compensation strategy based on a particular CUPS device, the Unified Power Quality Compensator (UPQC). A customized internal control scheme of the UPQC device was developed to regulate the voltage in the WF terminals, and to mitigate voltage fluctuations at grid side. The internal control strategy is based on the management of active and reactive power in the series and shunt converters of the UPQC, and the exchange of power between converters through UPQC DC–Link. This approach increase the compensation capability of the UPQC with respect to other custom strategies that use reactive power only.Simulations results show the effectiveness of the proposed compensation strategy for the enhancement of Power Quality and Wind Farm stability. Index Terms—Wind Energy, UPQC, voltage fluctuation, weakgrid.

I. INTRODUCTION

The location of generation facilities for wind energy is determined by wind energy resource availability, often far from high voltage (HV) power transmission grids and major consumption centers . In case of facilities with medium power ratings, the WF I connected through medium voltage (MV) distribution headlines. A situation commonly found in such scheme is that the power generated is comparable to the transport power capacity of the power grid to which the WF is connected, also known as weak grid connection. The main feature of this type of connections, is the increased voltage regulation sensitivity to changes in load . So, the system's ability to regulate voltage at the point of common coupling (PCC) to the electrical system is a key factor for the successful operation of the WF. Also, is well known that given the random nature of wind resources, the WF generates fluctuating electric power.These fluctuations have a negative impact on stability and power quality in electric power systems. Moreover, in exploitation of wind resources, turbines employing squirrel cage induction generators (SCIG) have been used since the beginnings. The operation of SCIG demands reactive power, usually provided from the mains and/or by local generation in capacitor banks . In the event that changes occur in its mechanical speed, ie due to wind disturbances, so theWFactive(reactive)power injected(demanded) into the power grid, leading to variations of WF terminal voltage because of system impedance. This power disturbances propagate into the power system, and can produce a phenomenon known as "flicker", which consists of fluctuations in the illumination level caused by voltage variations. Also, the normal operation of WF is impaired due to such disturbances.

A New Modular single phase Multilevel Inverter Topology for PV System Applications

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***Abstract*—**This paper proposes A new advanced single phase five level multilevel inverter for induction motor applications, which consist of less no of switching devices compare to conventional five level multilevel inverter. It consists of four switches and two bidirectional switches. It provides five level output voltage during normal operation The control capability of the converter is provided by using SPWMPOD technique, because of provision of less THD compare to other SPWM techniques. The validation of proposed topology under fault condition is employed by using MATLAB/SIMULINK claims.

Introduction: Now a days in industrial and Electric vehicle, which is the future form of clean transportation and the major infrastructural need of an electric vehicle is a charging station. Charging station based on solar energy is a perfect solution to make the system cleaner. The availability of multiple sources in case of solar energy enables multilevel inverters as most suitable inverters for solar power applications.

Conventionally, there are three basic types of multilevel inverters as Neutral Point Clamped (NPC) [1], Flying capacitor (FC) [2] and Cascaded H Bridge (CHB) [3]. These inverters were very popular for their modular structure, ease in control, higher efficiency and reduction in filter circuitry [4], [5]. For higher levels in output voltage, the switching device count, loss and the cost of the system are increased. To address these issues, various reduced switch topologies [6] are published. But, to synthesize a specific level in the output voltage, the possible switching combinations are limited and hence, the fault in any part of the inverter leads to complete shutdown of the system. This greatly affects the reliability of the inverter and thereby system is prone to isolation in case of faults in inverters. To address this issue of reliability, various fault tolerant topologies are proposed [7]. A conventional Cascaded H- Bridge (CHB) inverter is added with a bidirectional switch or relay at the output of each bridge to isolate the faulted bridge from the main circuit [8]. Another solution is proposed to avoid use of additional hardware in case of CHB by enabling either the top two switches or the bottom two switches to isolate the fault in a switch or source [9]. This increases the thermal stress on the switches as they are continuously operated. The basic single phase NPC structure is made fault tolerant by replacing the clamping diodes with the active switching elements [10]. The modified three phase active NPC structure is presented in [11] with inclusion of bi-directional switches. A hybrid inverter is proposed in [12] by the combination of one leg of Diode Clamped Inverter (DCI) and one leg of CHB with a bidirectional switch. This inverter addresses the source faults and switch faults apart from maintaining the charge balance. But, proposes switches in place of clamping diodes to overcome faults in any switch of the inverter. This increases the count of overall number of switches and thereby cost.

To overcome these issues, this paper proposes a reliable inverter topology that is modular, uses limited number of switches

I.PROPOSED INVERTER CIRCUIT:

Fig. 1. Proposed single phase five level inverter .

The proposed inverter circuit basic unit is designed with four unidirectional switches (S_1, S_4, S_5 and S_6) and two bidirectional switches (S_2 and S_3) as shown in Fig. 1. The basic unit has two DC sources (E_1 and E_2) considered as symmetrical sources and produces an output of five levels (+E, +E/2, 0, -E/2 and -E). Table-I shows all the possible switching combinations to produce various levels of output. It is evident from the table that there are two redundant states each for +E/2, 0 and -E/2 levels.

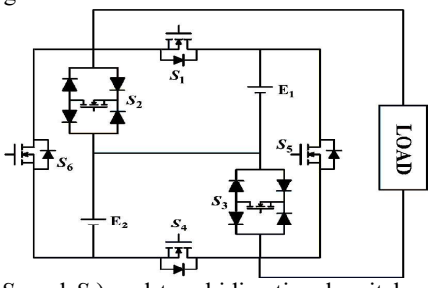

TABLE I: SWITCHING STATES FOR PROPOSED NVERTER:

Voltage Balance of Power Line Conditionerin H-bridge Inverter

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***Abstract*—Among the various multilevel inverters, cascaded multi level inverters are widely known for their many advantages like modularized circuit, requirement of less number of components as compared to other multilevel inverters and possibility of switching redundancy for inner voltage levels. For power conditioning applications a cascaded multi level inverter with capacitors can be used instead of dc sources. But the voltage balancing of dc capacitors is a critical problem. This paper presents an algorithm by which the capacitor voltages can be balanced significantly. The charging and discharging process of capacitor is dependent on the width of the output pulses.**

A mathematical model of H- bridge inverter based power conditioner is developed.Simulation has been carried out using MATLAB/ SIMULINK and the results are presented.

Index Terms— Cascaded H- Bridge Inverter, DC capacitor voltage balance, voltage balancing control technique, point of common coupling (PCC), power line conditioner(PLC), Active Power Filter(APF), Static Compensator (STATCOM)

I. INTRODUCTION

Because of the ever increasing demand of power the non-linear loads are being used widely. But the presence of these loads pollutes the power system as they draw large amounts of harmonic currents making it less suitable. Also there is always a need to control the power more efficiently and safely. In order to meet the demand and to achieve controllability modern power electronic equipment came into picture which has been revolutionalized over the past few decades.

But there are some problems associated with the power electronic equipment. Unlike the conventional loads, they control the flow of power by chopping, flattening, or shaping the system voltages or currents. These waveform distortions cause problems for neighbouring loads and tend to have a detrimental effect on the quality of power provided to the end users.

One solution that has great potential is the power line conditioner (PLC). This device can correct the network distortion caused by the power electronic loads by injecting equal but opposite distortion at selected PCCs. Thus the distortions can be compensated successfully to some extent. It appears to be an attractive method for reducing voltage and current distortion, power quality problems like voltage spikes, transients and flicker. Thus this device enhances the quality of the power that is being fed to the end user. Also it achieves good voltage profile by regulating the voltage.

PLCs use an inverter and DC source. The dc source is alternately connected or disconnected rapidly to absorb or supply power as per requirement. For power conditioning applications the dc source of an inverter consists of a capacitor that resists the voltage changes. Usually multilevel inverters are preferred as they reduce the voltage stress, output waveform is free of harmonics and the output power can be improved. Among the various topologies of multilevel inverters, the cascaded multi level inverter is the best option as it improves the voltage profile and compensates the reactive power and the harmonics caused by the non-linear loads. But the voltage balancing control of the capacitor is quite cumbersome.

This paper presents an algorithm for balancing the charging and discharging processes of the capacitors in order to maintain the equal voltages at the capacitors of two units of inverter. This process is based taking the output pulses of the inverter into consideration. This paper provides a detailed theoretical analysis. This method can be implemented to many industrial applications. A mathematical model is developed based on the output pulses of the H- bridge inverter utilizing the voltage switching functions is developed as a means to investigate the control technique and to offer insight to the problem. The regulation of the output pulses of the H- bridge inverter to redistribute the active power is reported.

Performance of Five Level Inverter with Induction Moor Fed by PV Generator

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Abstract: -In this project, it is to be represented theperformance of five level inverter fed by a photovoltaic (PV) generator and the induction motor is supplied by the inverter. Now-a-days the multilevel inverter ispreferable in PV system & Industrial applications because of its more advantage i.e. low harmonic distortion, low dv/dt stress. In this paper comprises of five level multi-level inverter over conventional inverter due to the phenomenal advantage of low harmonic distortion. The control capability of these inverters is performed by using SPWM technique. The performance and result of five level inverter with induction motor fed by PV generator system is to be implemented in MATLAB/SIMLINK platform.

Keywords: - PV System; Multi level inverter; SPWM Technique; Induction motor.

(1) INTRODUCTION

Renewable energy sources do not produce energy instantly unlike Conventional sources. They do not diminish in number or quantity by their use as they continuously restored by nature such as PV systems.

A PV system is also known as a photovoltaic system. This system designed in such a way that it absorbs the radiation of sun and converts it into electricity which means it converts solar energy to electrical energy.as we all know that solar cell is a basic unit of a PV system and these cells which are made up of semiconducting materials helps the PV system to directly convert the solar energy into electrical energy i.e., in term of direct current. There is need to convert this direct current (DC) into alternating current (AC). This can be achieved by using inverter. Here we used Multilevel Inverter which is five level. Now a days Multi level inverterare playing a major role in industrial applications due to their high voltage and high-powerapplications. By using multi-level inverter one can reduce the harmoniccontent present in the output voltage.Th concept of Multi-Level inverters do not depend on just two levels of voltage to create an AC signal. Instead several voltages are added to each other to create smooth stepped waveform i.e., with lower dv/dt and lower harmonic distortions. With more voltage levels in the inverter the waveform it creates becomes smoother.In Conventional inverters switching losses and switches required are more due to these five level inverters are preferred. A singly excited asynchronous motor i.e., induction motor is connected as load.

(2) BLOCK DIAGRAM

The fig below shows the arrangement of PV system, Multilevel level inverter with SPWM technique and Induction motor.

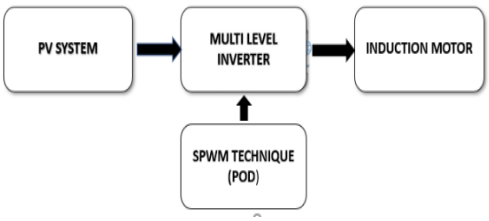

Fig.1.Block diagram

(3) PHOTOVOLTAIC SYSTEM

A photovoltaic system converts the sun's radiation, in the form of light, into usable electricity. It comprises the solar array and balance of system components.

A NEW ADVANCED MULTILEVEL INVERTER WITH MINIMUM NUMBER OF SWITCHES FOR INDUCTION MOTOR DRIVE

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ABSTRACT: Electric drive of high application require power electronics converters of high power rating. To meet this requirement, the multilevel inverter concept has been introduced for medium voltage and high power applications. The multilevel inverter becoming popular because of its advantages like low harmonics distortion, less rate of change voltage (dv/dt) and less THD. There are different types of multilevel inverters are introducing in to market such as diode clamped, flying capacitor and casade H-bridge(CHB) inverter. In all of above require 2(m-1) main switches for m-level output voltage. In order to obtain the 5-level output voltage the above MLI inverters require 8 switches. In this paper a novel five level ML inverter. Which is consist of 6 main switches only. Due to reduce of no of switches it has reduced losses and stresses. This converter being modeled and the results are compared with conventional diode clamped five level inverter. Here PODSPWM control technique is used to generate the pulses for the inverter. The validity of the novel multilevel inverter is verified by using MATLAB/Simulink environment.

KEYWORDS: PV System; Multi level inverter; Diode clamped MLI; SPWM Technique.

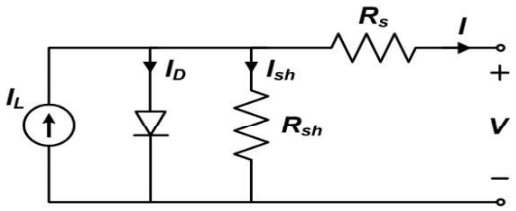
1. INTRODUCTION

Numerous industrial applications have begun to require higher power apparatus in recent years. Some medium voltage motor drives and utility applications require medium voltage and megawatt power level. For a medium voltage grid, it is troublesome to connect only one power semiconductor switch directly. As a result, a multilevel power converter structure has been introduced as an alternative in high power and medium voltage situations. A multilevel converter not only achieves high power ratings, but also enables the use of renewable energy sources. Renewable energy sources such as photovoltaic, wind, and fuel cells can be easily interfaced to a multilevel converter system for a high power application

Renewable energy sources do not produce energy instantly unlike Conventional sources. They do not diminish in number or quantity by their use as they continuously restored by nature such as PV systems.

2. PHOTOVOLTAIC SYSTEM

A photovoltaic (PV) system is able to supply electric energy to a given load by directly converting solar energy through the photovoltaic effect. The system structure is very flexible. PV modules are the main building blocks; these can be arranged into arrays to increase electric energy production. Normally additional equipment is necessary in order to transform energy into a useful form or store energy for future use. The resulting system will therefore be determined by the energy needs (or loads) in a particular application.



Fig(1) Ideal PV Cell Equivalent Circuit

$$I_{PV} = I_{ph} - I_d - I_p = I_{ph} - I_0\left(e^{\frac{V_{PV}+R_s I_{PV}}{n_s V_t Q_d}} - 1\right) - \frac{V_{PV}+R_s I_{PV}}{R_p}$$

where

V_{PV} = PV module voltage (V)

I_{PV} = PV module current (A)

I_{ph} = light current (A)

I_0 = diode reverse saturation current (A)

Q_d = diode ideality factor

n_s = number of cells in series

R_s = series resistance (Ω)

R_p = shunt resistance (Ω)

IOT BASED HOME AUTOMATION SYSTEM USING NODEMCU AND BLYNK

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Abstract:
The internet of things (IoT) is connecting the devices and tools to the internet network to be controlled by websites and smart phone applications remotely, also, to control tools and instruments by codes and algorithms structures for artificial intelligence issues. In case we want to create advanced systems using python algorithms, Wi-Fi or Ethernet connection is connected to our tools, equipment, and devices controlling them by smart phone applications or internet websites. That's actually the simplified definition of IoT. Farther than just using the IoT as a smart home to operate lamps or other home-use devices, it can be used as a security system or an industrial-use system, for example, to open or close the main building gate, to operate full automatic industrial machine, or even to control internet and communication ports. And more ideas can be done by using IoT technology. A huge industrial facilities or governmental institutions have much of lamps. Employees sometimes forget to turn them off in the end of the day. This research suggests a solution that can save energy by letting the security to control lighting of the building with his smart home by Blynk application. The lamps can be controlled by switches distributed in the building and Blynk application at the same time with a certain electrical installation. This research presents a simple prototype of smart home, or the easy way and low cost to control loads by Wi-Fi connection generally. Keywords: Blynk, Ethernet, IoT, Wi-Fi.

1. INTRODUCTION

A load controlled by computer systems has many advantages compared with manual controlled loads. Nowadays there are many programs and applications help to control things better using codes or python algorithms in artificial intelligence projects. In order to save energy and make loads monitored easily, this research suggests smart home project based on IoT technology. This smart home is an Internet of Things (IoT) project that controls loads with internet connection via Wireless Fidelity WIFI connection. A smart phone connected to internet with Blynk application as a control panel, and NodeMCU microcontroller kit in other side as a controller that receives control commands via WIFI signal. NodeMCU kit is built with ESP8266 WIFI receiver that able to process and analyze WIFI signal to input the microcontroller. The WIFI receiver and microcontroller are built in one kit to be used as IoT project. It's called NodeMCU. To connect the system to the Internet, needs a WiFi receiver. In my case I used ESP8266 that is connected as built-in in the NodeMCU board that contains a firmware runs with the ESP8266. The firmware is a low-level control computer software. The NodeMCU is coded via Arduino Integrated Development Environment (IDE) with the Universal Serial Bus port (USB) to tell the NodeMCU what to do, I want to make the NodeMCU controls four-channel relay kit by Blynk hand phone application and shows the temperature that measured by LM35 sensor. Parts used to create the project: 1) NodeMCU board. Open source internet of things platform. 2) AC-DC step down converter. Switch mode power supply to provide the project with power. This project needs 5 volts. 3) DC-DC step down converter as a regulator to convert the 12 V output of the power supply into regulated 5 V. 4) Four-channel relay kit. To drive loads from digital NodeMCU output pins. 5) LM35 temperature sensor. To measure room temperature. 6) Computer with Arduino (IDE) program installed to code the NodeMCU once. 7) Android smart phone with Blynk application installed to be used as control panel.

2. METHOD

This research is conducted based on the important steps that are done by orienting on the success indicators in connecting the NodeMCU ESP8266 module and other devices so that it can be used to

Voltage Balance of Power Line Conditionerin H-bridge Inverter

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***Abstract*—Among the various multilevel inverters, cascaded multi level inverters are widely known for their many advantages like modularized circuit, requirement of less number of components as compared to other multilevel inverters and possibility of switching redundancy for inner voltage levels. For power conditioning applications a cascaded multi level inverter with capacitors can be used instead of dc sources. But the voltage balancing of dc capacitors is a critical problem. This paper presents an algorithm by which the capacitor voltages can be balanced significantly. The charging and discharging process of capacitor is dependent on the width of the output pulses.**

A mathematical model of H- bridge inverter based power conditioner is developed.Simulation has been carried out using MATLAB/ SIMULINK and the results are presented.

Index Terms— Cascaded H- Bridge Inverter, DC capacitor voltage balance, voltage balancing control technique, point of common coupling (PCC), power line conditioner(PLC), Active Power Filter(APF), Static Compensator (STATCOM)

I. INTRODUCTION

Because of the ever increasing demand of power the non-linear loads are being used widely. But the presence of these loads pollutes the power system as they draw large amounts of harmonic currents making it less suitable. Also there is always a need to control the power more efficiently and safely. In order to meet the demand and to achieve controllability modern power electronic equipment came into picture which has been revolutionalized over the past few decades.

But there are some problems associated with the power electronic equipment. Unlike the conventional loads, they control the flow of power by chopping, flattening, or shaping the system voltages or currents. These waveform distortions cause problems for neighbouring loads and tend to have a detrimental effect on the quality of power provided to the end users.

One solution that has great potential is the power line conditioner (PLC). This device can correct the network distortion caused by the power electronic loads by injecting equal but opposite distortion at selected PCCs. Thus the distortions can be compensated successfully to some extent. It appears to be an attractive method for reducing voltage and current distortion, power quality problems like voltage spikes, transients and flicker. Thus this device enhances the quality of the power that is being fed to the end user. Also it achieves good voltage profile by regulating the voltage.

PLCs use an inverter and DC source. The dc source is alternately connected or disconnected rapidly to absorb or supply power as per requirement. For power conditioning applications the dc source of an inverter consists of a capacitor that resists the voltage changes. Usually multilevel inverters are preferred as they reduce the voltage stress, output waveform is free of harmonics and the output power can be improved. Among the various topologies of multilevel inverters, the cascaded multi level inverter is the best option as it improves the voltage profile and compensates the reactive power and the harmonics caused by the non-linear loads. But the voltage balancing control of the capacitor is quite cumbersome.

This paper presents an algorithm for balancing the charging and discharging processes of the capacitors in order to maintain the equal voltages at the capacitors of two units of inverter. This process is based taking the output pulses of the inverter into consideration. This paper provides a detailed theoretical analysis. This method can be implemented to many industrial applications. A mathematical model is developed based on the output pulses of the H- bridge inverter utilizing the voltage switching functions is developed as a means to investigate the control technique and to offer insight to the problem. The regulation of the output pulses of the H- bridge inverter to redistribute the active power is reported.

A New Modular single phase Multilevel Inverter Topology for PV System Applications

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***Abstract*—**This paper proposes A new advanced single phase five level multilevel inverter for induction motor applications, which consist of less no of switching devices compare to conventional five level multilevel inverter. It consists of four switches and two bidirectional switches. It provides five level output voltage during normal operation The control capability of the converter is provided by using SPWMPOD technique, because of provision of less THD compare to other SPWM techniques. The validation of proposed topology under fault condition is employed by using MATLAB/SIMULINK claims.

Introduction: Now a days in industrial and Electric vehicle, which is the future form of clean transportation and the major infrastructural need of an electric vehicle is a charging station. Charging station based on solar energy is a perfect solution to make the system cleaner. The availability of multiple sources in case of solar energy enables multilevel inverters as most suitable inverters for solar power applications.

Conventionally, there are three basic types of multilevel inverters as Neutral Point Clamped (NPC) [1], Flying capacitor (FC) [2] and Cascaded H Bridge (CHB) [3]. These inverters were very popular for their modular structure, ease in control, higher efficiency and reduction in filter circuitry [4], [5]. For higher levels in output voltage, the switching device count, loss and the cost of the system are increased. To address these issues, various reduced switch topologies [6] are published. But, to synthesize a specific level in the output voltage, the possible switching combinations are limited and hence, the fault in any part of the inverter leads to complete shutdown of the system. This greatly affects the reliability of the inverter and thereby system is prone to isolation in case of faults in inverters. To address this issue of reliability, various fault tolerant topologies are proposed [7]. A conventional Cascaded H- Bridge (CHB) inverter is added with a bidirectional switch or relay at the output of each bridge to isolate the faulted bridge from the main circuit [8]. Another solution is proposed to avoid use of additional hardware in case of CHB by enabling either the top two switches or the bottom two switches to isolate the fault in a switch or source [9]. This increases the thermal stress on the switches as they are continuously operated. The basic single phase NPC structure is made fault tolerant by replacing the clamping diodes with the active switching elements [10]. The modified three phase active NPC structure is presented in [11] with inclusion of bi-directional switches. A hybrid inverter is proposed in [12] by the combination of one leg of Diode Clamped Inverter (DCI) and one leg of CHB with a bidirectional switch. This inverter addresses the source faults and switch faults apart from maintaining the charge balance. But, proposes switches in place of clamping diodes to overcome faults in any switch of the inverter. This increases the count of overall number of switches and thereby cost.

To overcome these issues, this paper proposes a reliable inverter topology that is modular, uses limited number of switches

I.PROPOSED INVERTER CIRCUIT:

Fig. 1. Proposed single phase five level inverter .

The proposed inverter circuit basic unit is designed with four unidirectional switches (S_1, S_4, S_5 and S_6) and two bidirectional switches (S_2 and S_3) as shown in Fig. 1. The basic unit has two DC sources (E_1 and E_2) considered as symmetrical sources and produces an output of five levels (+E, +E/2, 0, -E/2 and -E). Table-I shows all the possible switching combinations to produce various levels of output. It is evident from the table that there are two redundant states each for +E/2, 0 and -E/2 levels.

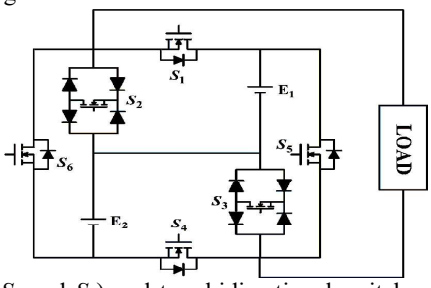

TABLE I: SWITCHING STATES FOR PROPOSED NVERTER:

H-bridge Inverter based Power Line Conditioner of Voltage Balance Method

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ABSTRACT

Among the various multilevel inverters, cascaded multi level inverters are widely known for their many advantages like modularized circuit, requirement of less number of components as compared to other multilevel inverters and possibility of switching redundancy for inner voltage levels. For power conditioning applications a cascaded multi level inverter with capacitors can be used instead of dc sources. But the voltage balancing of dc capacitors is a critical problem. This paper presents an algorithm by which the capacitor voltages can be balanced significantly. The charging and discharging process of capacitor is dependent on the width of the output pulses.A mathematical model of H- bridge inverter based power conditioner is developed. Simulation has been carried out using MATLAB/ SIMULINK and the results are presented.

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Wireless Auto Power Trip system for Liquefied Petroleum Gas Leakage To Improve Safety in Domestic usage

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Abstract:

Hazards related to gas leakage in household and a coal mine are increasing and has taken many precious lives. This project is used to design a system to decrease the fire accidents which occurs due to the leakage of gas in the existence in the existence of electricity. Here we have designed Arduino based LPG gas detector alarm that will detect the leakage and creates an alert.A gas sensor is used in this system to check the leakage if gas, once it notices the gas leaked then immediately gives a command to the microcontroller and then it makes the tripping mechanism activate for turning off the power supply in this project. Here we are using LM35 for temperature monitoring of present environment. Once the gas leakage is detected depending on the level of gas immediately the wireless systems will trip of the power supply so as to avoid explosion. The RF module is used to send the information to the alarm & tripping circuit remotely.

Keywords: Arduino Nano, RF transmitter/Receiver, Buzzer, LCD display, MQ2 gas sensor, Relay modules, LM35, MCB, Arduino IDE, Embedded C

1. INTRODUCTION:

As more and more households have started using LPG there is an increase in the number of accidents being reported owing to gas leakage. So our work aims at reducing accidents related to gas leakage in household as well as in industries. Gas leakage is one of the common reasons for fire breakouts. A leakage turns out to be cause of terrible accident particularly in closed buildings. Many of the hotels and restaurants do not keep any security measures to detect gas leakage due to lack of enforcement of standards and pre-assumption that installing such precautionary systems will be costly. This is a gas leakage detection project based on Arduino Nano[1]. The low cost project uses MQ6 gas sensor which can be calibrated to detect leakage levels based on surroundings. The installation generates a sound alert using buzzer on detection of a dangerous leakage. The project utilizes the 434 MHz RF module so the alarm can be installed anywhere within the building and even multiple alarms can be installed within a building.The project wireless auto power trip during gas leakage consists of two module i.e. transmitter module and receiver modulein transmitter module is consists of gas sensor, microcontroller or ARDUINO, encoder(HT12E), and transmitter module and the receiver module consists of RF.

(2) Working of the Project:

LPG gas sensor module is used to detect LPG Gas. When LPG gas leakage sensed, it will give a HIGH pulse on its DO pin and Arduino constantly reads its DO pin[2]. When Arduino receives a HIGH pulse from the LPG Gas sensor module it displays the“LPG Gas Leakage Alert” message on 16x2 LCD and stimulates buzzer which beeps again until the gas detector module doesn’t recognize the gas in the environment. When Arduino gets a LOW pulse from the LPG Gas detector module, then LCD will show the“No LPG Gas Leakage” alert message. Arduino manages the complete process of this system like

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DC MOTOR CONTROL USING AT80S52 MICROCONTROLLER

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ABSTRACT:

The project aims at developing a speedcontrol system for DC motors in four quadrants i.e. clockwise, anti-clockwise, forward brake and reverse brake. The project is useful to be used in industries for moving motors in both directions i.e. clockwise and anti-clockwise and can even apply forward and reverse brakes whenever required. The brakes functions by applying a reverse voltage in the motor for certain time. The speed is controlled by generating PWM pulses from microcontroller of 8051 family. A pair of push buttons is interfaced to microcontroller which is interfaced to operation motor by motor driver IC. The signals from the button are input to the microcontroller that in turn actuates motors in controlling speed.

(1).INTRODUCTION

Engineering design success depends in great part on reducing the time spent creating modules, mechanisms and machines. The use of accurate mathematical models can speed up the design process, and minimize the time wasted on trial and error design methods. Trial and error design methods are inefficient and costly. Matching a motor to a specific application is not easily accomplished through trial and error. Moreover, the necessity of purchasing and testing many dozens of motors is economically wasteful and time consuming. Instead, best practices make use of mathematical models early in the design process. The functional requirements and design parameters of a motor system can be determined early in the design process and manufacturer's published motor data can be researched in an attempt to find a suitable match. Designers andengineers use mathematical models to optimize the time spent designing modules, mechanisms and machines by: Reducing the number of possible items in the selection set andReducing testing and prototyping time.

1.1. Existing system:

Existing system does and the problem are and leads to a definition of a set of options from which users may choose their required system. This section will be discussing about the domain of this project, the existing system and finally the other techniques that applicable to be used while developing this project. It focused on the how to design and develop the project systematically according to the requirement of minimize the functional of conventional project how to control DC motor in different directions.

Improvement of Power Quality by using Dynamic Voltage Restorer Based Super Capacitor for Industrial Applications

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ABSTRACT

In modern power distribution systems power quality is considered as a major factor. For the fulfillment of industrial goals, modern industries are looking forward for new innovative technologies. The key requirement in any utility work is a disturbance free continuous power supply. The high quality power generated at the power stations are not delivered in the same form at the utility centers. This is mainly because of the widespread use of power electronic devices which introduced harmonics and other nonlinearities to the systems. The paper describes the application of super capacitor energy storage system for induction traction drive test bench that replaces a real electric public transport for performing testing and researches. The suitability and usage of such bench for research purposes is explained and the importance of the development of software mathematical model for performing simulations to be done before physical implementation measures is reasoned. The working principle of the bench and applied components are described. A virtual model of the bench was built and simulations were performed using Matlab/Simulink software. This concept results shows the superiority of the developed topology in voltage compensation capability and reliability. The proposed DVR has provided a regulated and sinusoidal voltage across the sensitive load.

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Power Quality improvement of Self-excited induction generator based STATCOM

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Abstract*—This paper deals with the performance analysis of static compensator (STATCOM) based voltage regulator for self-excited induction generators (SEIGs) supplying non-linear loads. In practice, a number of loads are non-linear in nature and therefore they inject harmonics in the generating systems. The SEIG being a weak isolated system, its performance is very much affected by these harmonics. The additional drawbacks of SEIG are poor voltage regulation and it requires adjustable reactive power source with varying load to maintain constant terminal voltage. A three-phase insulated gate bipolar transistor (IGBT) based current controlled voltage source inverter known as STATCOM is used for harmonic elimination and it provides required reactive power for the SEIG with varying loads to maintain constant terminal voltage. It also provides the required reactive power an SEIG needs to maintain a constant terminal voltage under varying loads. A dynamic model of an SEIG-STATCOM system with the ability to compensate the unbalanced current caused by single-phase loads that are connected across the two terminals of the three-phase SEIG under varying loads has been analyzed by using D-Q frame theory algorithm. This enables us to predict the behavior of the system under transient conditions. The simulated results shows that by using a STATCOM based voltage regulator the SEIG can balance the current; in addition to that the STATCOM is able to regulate the terminal voltage of the generator and suppresses the harmonic currents injected by non- linear loads.

Index Terms*—Self-excited induction generator (SEIG), single phase synchronous D-Q frame theory, static synchronous compensator (STATCOM).

I. INTRODUCTION

In modern world of globalization due to rapid increase in energy demand, most of the developing countries like India china, Russia, Malaysia are shifting towards renewable energy resources from conventional energy resources[1].

Most of the fossil fuel causes large amount of air pollution causing dangerous to the life of human beings and aquatic animals. These fossil fuel are very limited in nature and require millions of years for the formation. Therefore, the developing countries which contain abundant of renewable energy resources moves from conventional energy resources to renewable energy resources[2][3]. One of the most popular renewable energy resource is hydro power plant energy. The hydro micro turbine can be coupled with Self excited induction generator to power the remote areas such as villages and hilly areas. In remote areas it is not feasible of extension of power grid so, for these types of places a mini hydro turbine can be coupled with the self excited induction generator to power the rural and hilly areas. The main advantages of using self excited induction generator with renewable energy resources are low cost, rugged construction, durable, less maintenance requirement and able to generate power at varying shaft speed [4],[5].The standalone self excited induction generator (SEIG) is capable of providing power to many agricultural loads and domestic loads. Self excitation in induction generator with fixed shunt capacitor bank at the stator terminal demonstrate the basic principle of SEIG [6],[7]. These fixed capacitor bank fails to provide good power quality when runs with the dynamic loads as these loads are not constant throughout the years.

Most of the agricultural and domestic loads are dynamic in nature like water pump, washing machine, flour mills etc. Due to these dynamic loads the power quality of the self excited induction generator is very poor. Hence various types of FACTS devices must be use in order to improve the power quality of standalone self excited induction generator (SEIG).

There are many different types of FACTS devices such as STATCOM,[8] static var compensator (SVC), Electronic load controller (ELC) and switched capacitor scheme[9]. These methods provide better power quality but are limited due to frequent maintenance requirement and high cost. Hence one of the cheapest and reliable method to provide better power quality is placing of series capacitor with the addition of fixed shunt capacitor bank in between the terminal of self excited induction and dynamic load. In this paper, the behaviour of series compensated self excited induction generator with three phase induction motor as a dynamic load is studied.[10] The experiment is performed in the laboratory with and without series compensation to observed the behaviour of SEIG and to obtain improved power quality of SEIG with series compensation. It is necessary to choose a specific value of series capacitor to improve power quality of SEIG

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Reduction of Steady State Ripple of Vector Controlled Induction Motor Drives by Combining the Techniques of FOC and DTC

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ABSTRACT

To reduce the disadvantages of the existing Methods of field oriented control and direct torque control algorithms, the proposed method of the vector control algorithm mix the ideology of mutually field oriented control as well as direct torque control. The proposed algorithms generate the d-axis plus q-axes current references with the theory of existing field oriented control. As a result, by evaluate the current references as well as the actual currents error present signal is produced. As a result of with the error signals along with the lookup-tables, and the appropriate voltage vector will be chosen based on the theory of the direct torque control. Hence, the proposed method reduces the complexity when evaluated through the field oriented control as well as decreases the stable condition of the torque swells, when evaluate with the direct torque control method. So In this article, propose a 6-sector, 12-sector and 24-sector based lookup-tables designed for the vector control algorithm. The Mat-Lab-simulation results are exhibits the efficiency of the proposed techniques.

Keywords
Direct Torque Control (DTC), Field Oriented Control (FOC), vector control algorithm, lookup-table.

I. INTRODUCTION

In the present days asynchronous motors are uses in variable-speed drives appliance because of with a reduction of maintenance as well as lesser weight to volume proportion. So many existing algorithms are developed for the speed-control of motor drives. One of the existing algorithms is the scalar control, and also identified as the volts/hertz control method is easy for the execution. But, the main disadvantage of the scalar control offer slow reaction due to the coupling consequence flanked by the torque along with flux. To attain the decoupling controller in asynchronous motor drive related to the separately excited dc motor method, FOC method, and also known as vector based control method have been proposed [2]. The development of the field oriented control brings resumption in the field of the ac related drives. Afterward, a lot of enhancements have been proposed for the field oriented control [3]-[5]. The field oriented control offers quick transient response due to the decoupled control of torque as well as flux. Although, the field oriented control provides high-quality transient retort, the complexity taken addicted to more due to the revolution of reference framework.

To reduce the complexity worried in field oriented control (FOC), in the year 1980s, Takahashi expand proposed DTC method for motor drives [6]. The direct torque control (DTC), is simple for the suitable performance as well as it sprightly control the mutually torque as well as flux. It utilizes two hysteresis types of comparators designed for torque as well as flux loops along with a lookup-table for the selection of right voltage vector Method. However, the direct torque control method provides quick dynamic reaction related to that of field oriented control method, it presents massive stable condition deviation in current values, torque characteristics, and flux characteristics. A total evaluation involving field oriented control method as well as direct torque control method has been presented [7]. Additionally, the advantages and disadvantages of field oriented control method as well as direct torque control method are discussed. To reduce the complexity concerned in current controlled drives suitable to the transformation of reference framework, a

IoT Based Industrial Scada System

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Abstract—

Number of accidents happens within the industry are increased in great extent. These accidents are mainly caused because of system or machinery failure or because of irregular irresponsible monitoring and controlling of the system. Such accidents become hazardous for human life working there upon environment. To avoid such accidents happened due to errors in industrial systems, we need to control by monitoring the parameters automatically.

We can build a system which can be used as supervisory control and data acquisition that's SCADA. In day today life people want to possess world in their fingerprints; meaning use of internet is increased in great extent. Internet of things may be a new emerging technology which connects all the living or non-living things of the planet using internet. 'Internet of things' allows the communication between the people and things anytime, anywhere using this vast internet network. to watch and control such automation process we'll use this concept of internet of things. The data which is provided by different sensor like temperature, speed, light, pressure and so on. Are monitored employing a website called Thing Speak. We will also control this parameter by providing appropriate feedback command. For this communication between devices and website we use controlling device in conjunction with IOT. The system proposed during this project gives advance solution for the monitoring and controlling of the economic machine parameter from anywhere, anytime by using internet. For such purpose we use "thing speak" or "Blynk" web server.

Keywords: supervisory control and data acquisition (SCADA), Thing speak, Blynk web server

(1) INTRODUCTION

Proposed work on the wireless sensor network. By using WSN technology they built a system which is used in smart environment monitoring. Due to large increase in the overall population, increased industrial area, increased vehicles various toxic gases such as sulfur dioxide, nitrogen oxides are released in the air and pollution is increase. It may become dangerous for human life. So it has to be monitor and control. Technologies which are invented for the industrial automation deals with the monitoring and controlling of the various activities and different manufacturing process running in the industry. Machinery used in the industry has its own specification. Automation has much more importance in industry because due to automation overall productivity is increases. Quality of the product is also increase due to automation.

Once we get the idea about problem occurred then we have to analyze that problem. For this analysis we have to study total concept behind the problem. Before going to make new system it is more important to study the existing system. From this study we get to know what kind of requirements are fulfill till date and how to make the system more advanced and efficient than previous one using the latest technology. If we replace the old running manual process of operations by new emerging automated technologies then our product efficiency is increased in great extent. We can able to produce high quality of product within a less time consumption than manual controlling. Most of the

A Novel Method of Fuzzy Controller based DSTATCOM for Power Quality Improvement

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Abstract—In this paper Distribution Static Compensator (DSTATCOM) is implemented for the compensation of reactive power and unbalance caused by the various loads in distribution system. Back Propagation and ILST are the two types of control algorithm used for the extraction of reference source current. The neural network and fuzzy logic are used to design the alternative control schemes for switching the shunt active power filter. By using fuzzy controller instead of pi controller reduction in total harmonic distortion more convenient in real time applications A PI controller is a controller that produces proportional plus integral control action has only one input and one output & output value increases with input value. A fuzzy controller is a generalization of the conventional PI controller that uses an error signal and its derivative as inputs. These schemes are simulated under MATLAB environment using SIMULINK.

Index Terms—Back propagation (BP) control algorithm, harmonics, load balancing, power quality, fuzzy logic control.

I. INTRODUCTION

Both electric utilities and end users of electrical power are becoming increasingly concerned about the quality of electric power. The term power quality has become one of the most prolific buzzword in the power industry. The issue in electricity power sector delivery is not confined to only energy efficiency and environment but more importantly on quality and continuity of supply or power quality and supply quality. Electrical Power quality is the degree of any deviation from the nominal values of the voltage magnitude and frequency. Power quality may also be defined as the degree to which both the utilization and delivery of electric power affects the performance of electrical equipment. From a customer perspective, a power quality problem is defined as any power problem manifested in voltage, current or frequency deviations that result in power failure or disoperation of customer equipment. Power quality is certainly a major concern in the present era, it becomes especially important with the introduction of sophisticated devices, whose performance is very sensitive to the quality of power supply. Modern industrial processes are based a large amount of electronic devices such as programmable logic controllers and adjustable speed drives. The electronic devices are very sensitive to disturbances and thus industrial loads become less tolerant to power quality problems such as voltage dips, voltage swells, harmonics, flickers, interruptions and notches.

II. SYSTEM CONFIGURATION

The D-STATCOM is a three-phase and shunt connectedpower electronics based device. It is connected near the loadat the distribution systems. The major components of a DSTATCOMare shown in Fig 1.

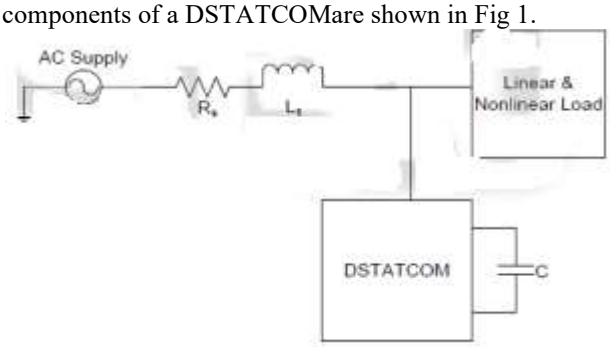

Fig.1. Basic building blocks of DSTATCOM.

It consists of a dc capacitor, three-phase convertermodule, ac filter, coupling transformer and a controlstrategy. The basic electronic block of the DSTATCOM isthe voltage sourced converter that converts an input dcvoltage into a three phase output voltage at fundamentalfrequency. The controller of the D-STATCOM is used tooperate the inverter in such a way that the phase anglebetween the inverter voltage and the line voltage isdynamically adjusted so that the DSTATCOM generates orabsorbs the desired VAR at the point of connection.

III. SYSTEM CONFIGURATION AND CONTROL ALGORITHM

A voltage source converter (VSC)-based DSTATCOM is connected to a three phase ac mains feeding three phase linear/nonlinear loads with internal grid impedance which is shown in Fig. 2. The performance of DSTATCOM depends upon the accuracy of harmonic current detection. For reducing ripple in compensating currents, the tuned values of interfacing inductors (Lf) are connected at the ac output of the VSC. A three phase series combination of capacitor (Cf) and a resistor (R_f) represents the shunt

A Novel Method of Fuzzy Controller based DSTATCOM for Power Quality Improvement

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Abstract—In this paper Distribution Static Compensator (DSTATCOM) is implemented for the compensation of reactive power and unbalance caused by the various loads in distribution system. Back Propagation and ILST are the two types of control algorithm used for the extraction of reference source current. The neural network and fuzzy logic are used to design the alternative control schemes for switching the shunt active power filter. By using fuzzy controller instead of pi controller reduction in total harmonic distortion more convenient in real time applications A PI controller is a controller that produces proportional plus integral control action has only one input and one output & output value increases with input value. A fuzzy controller is a generalization of the conventional PI controller that uses an error signal and its derivative as inputs. These schemes are simulated under MATLAB environment using SIMULINK.

Index Terms—Back propagation (BP) control algorithm, harmonics, load balancing, power quality, fuzzy logic control.

I. INTRODUCTION

Both electric utilities and end users of electrical power are becoming increasingly concerned about the quality of electric power. The term power quality has become one of the most prolific buzzword in the power industry. The issue in electricity power sector delivery is not confined to only energy efficiency and environment but more importantly on quality and continuity of supply or power quality and supply quality. Electrical Power quality is the degree of any deviation from the nominal values of the voltage magnitude and frequency. Power quality may also be defined as the degree to which both the utilization and delivery of electric power affects the performance of electrical equipment. From a customer perspective, a power quality problem is defined as any power problem manifested in voltage, current or frequency deviations that result in power failure or disoperation of customer equipment. Power quality is certainly a major concern in the present era, it becomes especially important with the introduction of sophisticated devices, whose performance is very sensitive to the quality of power supply. Modern industrial processes are based a large amount of electronic devices such as programmable logic controllers and adjustable speed drives. The electronic devices are very sensitive to disturbances and thus industrial loads become less tolerant to power quality problems such as voltage dips, voltage swells, harmonics, flickers, interruptions and notches.

II. SYSTEM CONFIGURATION

The D-STATCOM is a three-phase and shunt connectedpower electronics based device. It is connected near the loadat the distribution systems. The major components of a DSTATCOMare shown in Fig 1.

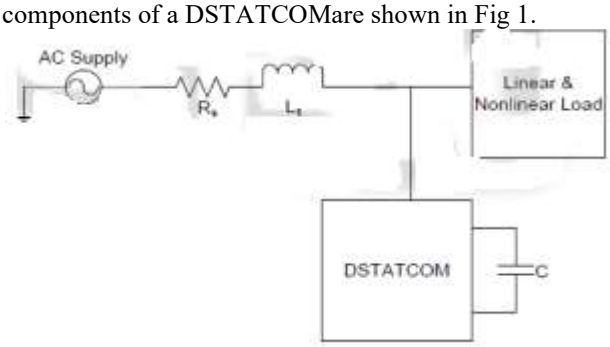

Fig.1. Basic building blocks of DSTATCOM.

It consists of a dc capacitor, three-phase convertermodule, ac filter, coupling transformer and a controlstrategy. The basic electronic block of the DSTATCOM isthe voltage sourced converter that converts an input dcvoltage into a three phase output voltage at fundamentalfrequency. The controller of the D-STATCOM is used tooperate the inverter in such a way that the phase anglebetween the inverter voltage and the line voltage isdynamically adjusted so that the DSTATCOM generates orabsorbs the desired VAR at the point of connection.

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Power-Quality Improvement of a Novel Multilevel Based DSTATCOM

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Abstract-Distribution static compensator (DSTATCOM) is a shunt compensation device that is generally used to solve power quality problems in distribution systems. In an all-electric ship power system, power quality issues arise due to high-energy demand loads such as pulse loads. In this project a new algorithm to generate reference voltage for a distribution static compensator (DSTATCOM) operating in voltage-control mode. Three filter capacitors, one for each phase, are connected in parallel with the DSTATCOM to eliminate high-frequency switching components. The voltage across the filter capacitor is controlled by a dead-beat controller to maintain the AC bus voltage. The magnitude of the bus voltage is chosen as nominal value, i.e., 1.0 p.u., while its phase angle is obtained through a feedback loop that maintains the voltage across the DC storage capacitors. The proposed scheme ensures that unity power factor (UPF) is achieved at the load terminal during nominal operation, which is not possible in the traditional method. Also, the compensator injects lower currents and, therefore, reduces losses in the feeder and voltage-source inverter. Nearly UPF is maintained, while regulating voltage at the load terminal, during load change. The state-space model of DSTATCOM is incorporated with the deadbeat predictive controller for fast load voltage regulation during voltage disturbances. DSTATCOM to tackle power-quality issues by providing power factor correction, harmonic elimination, load balancing, and voltage regulation based on the load requirement and simulation results are presented by using Matlab/Simulink platform.

Index Terms—Current control mode, power quality (PQ), voltage-control mode, voltage-source inverter.

I. INTRODUCTION

Rapid advances in more environmentally-friendly smartgrid technologies are influencing the 21st century leading economies such as the US, China, and Europe to shift from the 20th century electric grid. As these economies become flamboyant and so has the utility of electricity intensified as a catalyst for economic growth among these nations. With transmission and distribution networks still serving as critical link between electric generators and their consumers, the technological sophistication garnered so far does not match the consumer's power quality and reliability demands. Hence, it is about time to transform the current grid (often referred to as "dumb-grid"). The distribution system is relatively perceived as an interface between the bulk and the custom powers, whose control objective is to strike a balance between the two for maintaining continuous healthy operation of the system. A good distribution control system is therefore expected to enhance the overall system efficiency through loss reduction and power quality control. Presently, distribution system equipment such as the tap changing transformers, synchronous machines, capacitor banks, static voltampere-reactive compensators (SVCs), and many other flexible ac transmission systems (FACTS) controllers at device level, including DSTATCOM are being applied for such control. However, there are numerous challenges facing the area at the moment in terms of the smart-grid de-centralizing functionality which include: voltage and reactive power compensation (now known as Volt-VAR optimisation); distribution system automation (DSA); power factor correction (PF); phase current balancing; integrate-able low loss transformers (to improve efficiency), distributed resources (typically, between 1kW - 50MW), and dispersed energy storage facilities (normally sited at consumer loads), which call for radical change in the type of controllers designed in these equipment for general system power quality improvement. Power quality issues, causes, effects and analysis have become an important aspect of research work in recent days. As the power is generated in power stations which are generally far away from load centers, the huge amount of power generated from a generating station is transported to the consumer through transmission lines. The transmission of power from the generating point to the point of consumption is combined with variations of weather, variations in loads, variations in demands etc. which compromises the quality of power. Industrial and commercial consumers of electrical power are becoming increasingly sensitive to power quality problems. Reliability and quality are two important parameters in the field of power engineering. Combining today's utility power with the ever increasing quantity of electrical sensitive load yields one of the major contributors to downtime in business and industries today.

A Novel Method of Three Phase Seven Level CHB Inverter for Industrial Applications

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ABSTRACT

In this paper a modified switching pattern for 7 level cascaded H Bridge inverter is presented. Basically inverter is a device that converts DC power to AC power at desired output voltage and frequency. Demerits of inverter are less efficiency, high cost, and high switching losses. To overcome these demerits, we are going to multilevel inverter. Though the multilevel inverters hold attractive features, usage of more switches in the conventional configuration poses a limitation to its wide range application. Cascaded multilevel inverter has the advantage of most reliable and to achieve the best fault tolerance owing to its modularity; a feature that enables the inverter to continue operating at lower power levels after cell failure. Modularity also permits the cascaded multilevel inverter to be stacked easily for high power and high voltage applications. Therefore, a renewed 7-level multilevel inverter topology is introduced switching pattern of cascaded H bridge inverter topology is analyzed through thermal module of power electronic switches thereby ensuring the minimum switching losses, reducing size and installation cost. The proposed inverter provides higher output quality with relatively lower power loss with the induction motor drive. The performance and results are evaluated by using Matlab/Simulink software.

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IoT based Substation Monitoring and Control Using Arduino

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Abstract:
A new smart voltage and current monitoring system (SVCMS) technique is proposed. It monitors a single phase electrical system using an Arduino platform as a microcontroller to read the voltage and current from sensors and then wirelessly send the measured data to monitor the results using a new Blynk application. The purpose of this project is to acquire the remote electrical parameters like voltage, current and frequency and send these real time values over WSN network using Wifi along with temperature at power station. This project is also designed to protect the electrical circuitry by operating an spdt relay. This system can be designed to send alerts whenever the relay trips or whenever the voltage or current exceeds the predefined limits. This project makes use of a Arduino controller. The integrated smart voltage and current monitoring system design uses an Arduino Nano as the microcontroller to measure the results from voltage and current sensors and then send this data, after calculation, to the smartphone device of an end user using Wi-Fi module. The Arduino Nano controller and ESP8266 W-Fi module are a cheap microcontroller and wireless device, respectively. This proposed system presents an IoT based real time online electric substation monitoring system.

Keywords: PCB, Arduino board, ESP 8266, LCD display, Current sensor, Voltage sensor, Frequency, Relay module, LM 35 sensor, Embedded C, Arduino IDE, Blynk App

(1). Introduction:

Supplying electricity to consumers necessitates power generation, transmission, and distribution. Initially electric power is generated by using electric generators. A huge amount of power is lost during the transportation of the general power which leads to the reduction in the quality of power received at substation. IoT is a proficient paradigm of interconnected things which permits the physical items or objects to connect, act together and exchange data with other items or object[1]. The main objective of IoT is not only to establish communication among items or objects but also to automate the tasks. The area of applications of IoT follows the broaden approach that includes home automation, health care, energy systems, smart cities, agriculture and industries. To Improve the quality of power with a different solution, it is necessary to be familiar with what sort of constraint has occurred. Additionally, if there is any inadequacy in the protection, monitoring, and control of a power system. The system might become unstable. Therefore it necessary a monitoring system that can automatically detect, monitor, and classify the existing constraints on electrical lines The solution to all these problems is automation of the substations[2]. The various parameters like current, temperature and voltage are continuously sensed with the help of different sensors. The output signals from sensors are given to Analog to Digital Converter (ADC) and then to the microcontroller. Microcontroller is preprogrammed in such a way that if the parameters exceed predefined threshold value then it will inform the intermediate or main station with the help of wireless communication technologies like BLUETOOTH, GSM etc.

Objective of paper:

- To improve quality of power
- Remote sensing
- To Maintain Continuity of supply
- Real time monitoring.

(2). Proposed method:

The purpose behind this undertaking is to secure the unknown electrical parameters like Voltage, Current and Frequency and send these ongoing qualities over IOT based checking and control with the temperature at the power station. This venture is additionally intended to ensure the electrical hardware by working an Electromagnetic Relay[3]. This Relay gets enacted at whatever point the electrical parameters surpass the predefined esteems. The Relay can be utilized to run a Circuit Breaker to turn off the fundamental electrical supply. The client can send orders as IOT to peruse the remote electrical parameters. This system additionally can consequently send the continuous electrical parameters intermittently (in view of time settings) as SMS. This system can be intended to

SOLAR-WIND HYBRID POWER Grid SYSTEM

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Abstract –According to many renewable energy experts, a small "hybrid" electric system that combines homewindelectricandhomesolar electric(photovoltaic or PV) technologies offers several advantages over either single system. In much of the United States, wind speeds are low in the summer when the sun shines brightest and longest. The wind is strong in the winter when less sunlight is available. Because the peak operating times for wind and solar systems occur at different times of the day and year, hybrid systems are more likely to produce power when you need it. Many hybrid systems arestandalone systems, which operate "off-grid" -- not connected to an electricity distribution system. For the times when neither the wind nor the solar system are producing, most hybrid systems provide power through batteries and/or an engine generator powered by conventional fuels, such as diesel. If the batteries run low, the engine generator can provide power and recharge the batteries. Adding an engine generator makes the system more complex, but modern electronic controllers can operate these systems automatically. An engine generator can also reduce the size of the other components needed for the system. Keep in mind that the storage capacity must be large enough to supply electrical needs during noncharging periods. Battery banks are typically sized to supply the electric load for one to three days.
It helps in decreasing the dependence on one single source and makes the system more reliable. The hybrid system can be used for both industrial and domestic applications

The main objectives of the project are:

1.solar panel
2.Battery bank
3.loads
4.inverter
5.wind turbine
6.Arduino IDE
7.Embedded c
8.LCD dispaly

1. INTRODUCTION

We require electricity for operating almost all the appliances we use in our day to day life. So it has become an indispensable part of our life. Now there are two ways to produce electricity first by using non-renewable sources of energy and second by renewable sources of energy. With increase in population and advancement of technology, consumption of electricity is also increasing exponentially. Simultaneously, we have to increase the production of electricity also in order to meet the demands of growing population. The biggest disadvantage with the usage of conventional resources is that their usage causes pollution due to the production of various pollutants like ash in case of a coal power plant, smoke in case of diesel power plant, radioactive material in case of nuclear power plant. Maintaining these pollutants is not an easy task and it also requires a lot of money. So we have to find some other methods to produce electricity. The best possible way is by using non-conventional sources of energy. Out of all the possible options available in non-conventional sources of energy, solar and wind are the best methods. As tidal energy can be used only on the sea shores, ocean thermal energy can used in the middle of the sea and its setup is also very difficult. While solar and wind are available in all the areas of the world and setting up their power plant is also not a cumbersome task. The availability of solar energy is a major concern, as it is available for around 8 hours in a day, on the other hand wind is available almost for 24 hours. But we can do one thing to make up for that problem by integrating these two together. During foul weather conditions one of them can be used while during normal weather both can be operated together. So in this paper we will be describing a solar-wind hybrid power system.

1.1 Solar Energy

Solar energy is that energy which we get from the sun in form of radiation. It does not cause any kind of pollution, it is inexhaustible. It is available free of cost. Specially, in a country like India where sun shines for almost 300 days in a year, it is therefore a convenient mode of electricity production. Meager amount of investment is involved in setting up a solar power plant

Advanced Single Phase Three Level Multilevel Inverter for Renewable Energy Systems

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ABSTRACT

Now a day's multilevel inverters are more use full in industrial, renewable energy Systems and Electrical vehicle applications due to it low voltage stresses, low switching losses and low Total Harmonic distortions. In this paper a new single phase three level multilevel inverter was introduced which provides 3-level output voltage with less THD, which is used in renewable energy system applications. It has multilevel DC-DC converter with a direct current (DC) link capacitor voltage balance feature. The multilevel DC- DC converter operates in bi-directional manner, which is a fundamental requirement in renewable energy systems. Compared to the conventional configurations, the proposed one only implements two extra power switches and a capacitor to balance the voltage of the MLI capacitor over a complete drive cycle or at fault conditions. Moreover, the proposed configuration, due to the high frequency cycle-by-cycle voltage balance between C1 and C2, small in size and low weight of the converter by 20%. The proposed configuration is tested and validated by MATLAB/SIMULINK environmental.

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Harmonic Reduction of Grid Integrated Solar PV System by Using VSC

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ABSTRACT

This paper presents execution of a two phase three stage PV-network interfaced framework with a three stage VSC which has been used as a multifunctional gadget. Versatile commotion lessening method is utilized to control multifunctional VSC which exchanges the dynamic power from PV framework to the matrix and furthermore acts as a dynamic power filter (APF) to enhance control quality at AC mains. The control calculation exhibited here has a quick and exact dynamic reaction. The proposed SPV vitality framework has been executed with straight and non-direct load to indicate consonant end, stack adjusting and control factor amendment.

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Design and Implementation of Real-Time Transformer Health Monitoring System

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ABSTRACT

To design a protective circuit for transformer, based on programmable Arduino to monitor transformer temperature, voltage and current by using sensors. To design an communication system using Arduino controlled Wifi module to transfer the over voltage, over current and over temperature fault values to mobile devices. This project presents the design and implementation of a mobile embedded system to monitor load currents, over voltage and temperature. The implementation of online monitoring system integrates internet of things (IOT) Modem, with single chip Arduino nano, ESP 01 and sensors. This is implemented by using on-line measuring system using Internet of Things (IOT), with single chip Arduino microcontroller and sensors. It is installed at the distribution transformer site. The output values of sensors are processed and recorded in the system memory. System programmed with some predefined instructions to check abnormal conditions. This Internet of Things (IOT) will help the utilities to optimally utilize transformers and identify problems before any catastrophic failure occurs. The IOT module will send SMS (Short Message Service) messages to designated mobile telephones using blynk application.

Keywords: Arduino Nano, ESP 8266 Wifi module, ACS712 current sensor, LM 35 sensor, Transformer, IoT, Blynk server

(1) Introduction:

Today, internet has become an integral part of people's lives, influencing the daily activities of almost every human being. Evidently, every second smart phones with sophisticated functionalities are released out in the market. It infers that internet users in accordance with the booming smartphone use are multiplying vigorously day by day. Thus, connecting every- thing possessed by a human to the internet and subsequently monitoring and further controlling through smartphones is the ultimate goal of this project[1]. A recent huge interest in Machine to Machine communication is known as the Internet of Things (IoT), to allow the possibility for autonomous devices to use Internet for exchanging the data. This work presents design and execution of real time monitoring and fault detection of transformer and record key operation indicators of a dispersion transformer like load ,fire, gas, transformer temperature and humidity. They have to look at it continuously. By using this project it can minimize working efforts and improve accuracy, stability, efficiency. In this project, sensors are used to sense the main parameters of equipment such as fire, gas, temperature[2]. This sensed data is sent to microcontroller and this controller checks parameter limits which further send to the IoT web server Blynk software using Wi-Fi module. Of these data make sure the right information is in hand to the operator and operator can make useful decisions before any catastrophic failure on the basis of data of parameters.

1.1.Existing system:

- Currently, failure of the transformer can be detected by color changing of silica gel and decreasing the quality and viscosity of oil.

ARDUINO CONTROLLER BASED FAULT DETECTION AND PROTECTION OF AC MOTOR AGAINST ABNORMAL CONDITIONS

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ABSTRACT:

This paper presents a Arduino based control system for the protection of a single phase induction motor. The use of microcontroller technology has enabled the design of energy efficient and cost-effective reliable control systems for induction motors. It also describes protection of AC Motor from over voltage. Fault monitoring and diagnosis are performed using Arduino IDE environment. AC motors are used in many home applications in a wide range of operating areas because of their simple and robust structure, and low production costs. These motors are commonly used in industrial drive because they are simple to construct, reliable, cheap and easy to operate. It is a very important electrical device in the present period of automation. Providing a protection system is very important in Household appliances. The purpose for development of this project is to provide safety to industrial motors, lift motors, pumps etc. The main purpose of our project is to protect an induction motors from fault such as overvoltage, over current, under voltage, under current. Fault classification is achieved through the microcontroller which includes a program for fault classification. When the fault occurs, the Arduino controller sends a signal to the interfaced digital relay to trip the motor circuit and another signal to an LCD to display the type of fault. The use of microcontroller reduces the response time of the protection system and makes it more suitable for real time operation.

Keywords: one phase induction motor, fault classification, Arduino nano, PCB, 16X2 LCD display, Current sensor, Voltage sensor, Transformer, AC induction motor, Relay module, Jumper wires, Embedded C, Arduino IDE.

Simulation of Fuzzy controller Based Dual UPQC

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Abstract— **Implementation of intelligence controller by using voltage as feedback for significantly improving the dynamic performance of UPQC, the comparative analysis of several control strategies fed UPQC for power quality improvement features is presented. Fuzzy control has emerged as one of the most active and fruitful areas for research in the applications of fuzzy set theory, especially in the realm of industrial process, which do not lend of quantities data regarding the input-output relations. This paper presents a simplified intelligent control technique for a dual three-phase topology of a unified power quality conditioner i-UPQC. The i-UPQC is composed of two active filters, a series active filter and a shunt active filter (parallel active filter), used to eliminate harmonics and unbalances. Different from a conventional UPQC, the i-UPQC has the series filter controlled as a sinusoidal current source and the shunt filter controlled as a sinusoidal voltage source. Therefore, the pulse width modulation (PWM) controls of the i-UPQC deal with a well-known frequency spectrum, since it is controlled using voltage and current sinusoidal references, different from the conventional UPQC that is controlled using non sinusoidal references. The dynamic analysis of proposed scheme is evaluated by using Matlab/Simulink platform & results are presented.**

Index Terms— **Active filters, control design, Fuzzy Controller, power line conditioning, unified power quality conditioner (UPQC).**

I. INTRODUCTION

The practice of power quality conditioners in the distribution system network has enlarged during the past years due to the steady increase of nonlinear loads connected to the electrical grid. The current exhausted by nonlinear loads has a great harmonic content, varying the voltage at the utility gridand subsequently affecting the operation of critical loads. Through using a unified power quality conditioner (UPQC), it is probable to ensure a controlled voltage for the loads, balanced and with low harmonic distortion and at the same time draining undistorted currents from the utility grid, even if the grid voltage and the load current have harmonic substances.TheUPQC contains of two active filters, the Series Active Filter (SAF) and the Shunt or Parallel Active Filter (PAF) [1], [2]. The Shunt filter is generally controlled as a non-sinusoidal current source, which is liable for compensating the harmonic current of the load;however the SAF is controlled as a non-sinusoidal voltage source, which is responsible for compensatingthe grid voltage. Both filters have a control reference with harmonic contents, and usually, these references might be attained through complex methods [4], [5], [14], [17], [21],[23]. Various works show a control technique to both PAF and SAFs which uses sinusoidal references without the necessity of harmonic extraction, in order to decrease the complexity of the reference generation of the UPQC. An exciting alternative for power quality conditioners was proposed and it was called line voltage regulator/conditioner. This voltage regulatorinvolves of two single-phase current source inverters where the PAF is controlled by a voltage loop and the SAF is controlled by a current loop. In this way, both grid current and load voltage are sinusoidal, and therefore, their references are also sinusoidal. Some authors have applied this concept, using voltage source inverters in uninterruptable power supplies and in UPQC [10], [25]. In [10], this concept is called ―dualtopology of unified power quality conditioner‖ (iUPQC), and the control schemes use the p-q theory, requiring determination in real time of the positive sequence components of the voltages and the currents. The aim of this paper is to suggest a simplified control technique for a dual three-phase topology of a unified power quality conditioner (iUPQC) to be used in the utility grid connection. The suggested control scheme is developed in ABCReference frame and allows the use of classical control theory without the requirement for coordinate transformers and digital control implementation. The references to both Series and PAFs are sinusoidal, dispensing the harmonic extraction of the grid current and load voltage.

II.DUAL UPQC

The conventional UPQC structure is composed of a SAF and a PAF, as shown in Fig. 1. In this configuration, the SAF works as a voltage source in order to compensate the grid distortion, unbalances, and disturbances like sags, swells, and flicker. Therefore, the voltage compensated by

Improvement of Power Quality by using Dynamic Voltage Restorer Performance for Induction Motor Drives

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ABSTRACT

Electronic devices function properly as long as the voltage of the supply system feeding the device stays within a consistent range. There are different types of voltage fluctuations that can cause Power quality problems, including, sags, harmonic distortions, surges and spikes and momentary disruptions, nonstandard voltage, current or frequency that results in a failure or miss operation of end user equipment. The steady-state PQ characteristics of the supply voltage include surges and spikes. Voltage sags and swells are the common events on the electric power network. Voltage sags and swells are the common events on the electric power system. The common causes of voltage sag are short circuit or faults in power system, at starting of large loads and faulty conductor. These problems can be mitigated with voltage injection method using custom power device, Dynamic Voltage Restorer (DVR). A DVR is connected in series with the linear load to compensate for the harmonics and unbalance in the source voltages and improve the power factor on the source side A series connected converter based mitigation device, the Dynamic Voltage Restorer(DVR), is the most economical and technically advanced mitigation device proposed to protect sensitive loads from voltage sags. In this paper, DVR which consists of injection transformer, filter unit, Pulse Width Modulation (PWM) inverter, energy storage and control system is used to mitigate the voltage flickers in the power distribution system. Here we propose two control techniques which are the Proportional Integral (PI) Controller and Fuzzy Logic (FL)

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Simulation of Fuzzy Logic Controller Based Four Phase Switched Reluctance Motor

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ABSTRACT

The switched reluctance motor drives has evolved as an alternative to conventional motors in variable speed drives because of advantages like simple and rugged structure, absence of rotor winding, adaptability to harsh environments like coal mining, high speed operation etc. Because of nonlinearity, torque ripple is high in the motor. Switched reluctance motors (SRM) have many advantageous characteristics comparing to those of the conventional AC and DC machines. The mechanical simplicity in construction of the SRM can be seen through their purely laminated-steel structure without permanent magnets, rotor windings and squirrel-cage bars. Thus, SR machines offer high reliability and robustness in operation. The Switched Reluctance Motor (SRM) has highly gains interested in many industrial applications. On the other hand the SRM also have the disadvantage points such as high torque ripple and nonlinearity characteristic. This paper presents the development of the drive system for a four-phase 8/6 switched reluctance motor with fuzzy logic controller for testing and obtaining characteristics of the SRM.By using MATLAB/SIMULINK software.

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Harmonic Elimination with Nine Level Inverter for Single Phase Grid Connected System

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ABSTRACT:

At present industries having highly requirement of power usage. Some appliances in the industries are necessary for low power functioning . Make to operate a high power source for all industrial loads and its favourable to some motors need for a particular purpose to high power, to effect injuriously for other loads. Moderate medium size of voltage motor drives and advantage, applications need for medium voltage. Multilevel inverter work has commenced in early 1975 as an choice in high power and medium voltage settings. The multilevel inverter is same as inverter used in industrial appliances as an alternative in high power and medium voltage situations.

Multilevel inverter is away from something which recently is very important option in area of high power medium voltage energy control. The lecture and appearance of multi cells consists of separate dc source. Multilevel inverters are favourable and they have nearly sinusoidal output voltage waveform with more harmonic profile, by reducing stressing of electrical components. The commonly used seven level inverter for grid connected photovoltaic system with PWM technique. By using this concept to acquire nine level inverter output voltage we need four full bridge series inverters. By consuming dc supply voltage inverter is able to produce nine levels of output voltage levels. The invention of inverter system is able to producing nine levels of output voltage levels dc source voltage by using three cascaded H-Bridge type inverters. Mainly this project consists of three H-bridge inverters with different dc sources. The multilevel inverters are potential for high performance with reduced EMI and harmonics . The proposed project for nine level inverter was designed by using MATLAB/SIMULINK software. The other benefit of using this project is to minimize the number of electronic devices for given number of levels.

Key words: H-bridge inverters, PWM technique

(1) INTRODUCTION:

Numerous industrial applications require higher power apparatus in recent years. Some medium-voltage motor drives and utility applications require medium voltage and megawatt power level. For a medium-voltage grid, it is troublesome to connect only one power semiconductor switch directly. Hence,a multilevel power converter structure has been introduced as an alternative in high power and medium voltage situations
A multilevel converter not only **achieves high power ratings** but also enables the use **of renewable energy** sources. Renewable energy sources such as photovoltaic, wind, and fuel cells can be easily interfaced to a multilevel converter system for a high-power application [1, 2, 3]. The concept of multilevel converters has been introduced since 1975.

The increasing demand in electrical energy, depletion in fossil fuel reserves and the rise in energy prices have required to use the available energy resources more effectively.so, the power electronic converters with power semiconductor switches have increased attention due to is capability of converting and controlling of electrical power in a wide range of Milli watts to Giga watts. Controlled ac drives are usually connected to the medium-voltage network (2.3 KV-13.8 KV) will covers a power range of 0.2 MW to 40 MW. But today, it is very hard to connect a single semiconductor device directly to medium-voltage grids (2.3, 3.3, 4.16, or 6.9 kV). For these reasons, a multilevel inverters has emerged as the solution for working with higher voltage levels [4].

However, the elementary concept of a multilevel converter in order to achieve higher power is to use a series of power semiconductor switches with several lower voltage dc sources to perform the power conversion by synthesizing a staircase voltage waveform. Capacitors, batteries, and renewable energy voltage sources can be used as the multiple dc voltage sources [1-4]. The commutation of the power switches aggregate these multiple dc sources in order to achieve high voltage level at the output. However, the rated voltage of the power semiconductor switches depends upon the rating of the dc voltage sources to which they are connected.

A multilevel converter has several advantages over a conventional two-level converter that uses high switching frequency pulse width modulation (PWM).Multilevel inverters are three types 1. Diode clamped multilevel inverter 2. Flying capacitors multilevel inverter 3. Cascaded H- bridge multilevel inverter. Among these Diode clamped requires more number of diodes and flying capacitor has capacitor balancing problem. The cascaded H-bridge inverters having more advantages such as modular structure compare to other topologies, less number of components, less switching losses and low device stress. It is one of the topologies proposed for drive applications which meet the requirements such as high power rating with reduced THD and switching losses. The asymmetrical cascaded H-Bridge MLI reduces the number of input DC sources required for getting the same number of levels in the output as in the symmetrical cascaded H-Bridge MLI [4].

This paper presents the cascaded H-bridge multilevel inverters for single phase grid connected system and their effects on grid current. Any carrier based PWM is applicable for cascaded H-bridge (CHB). The working of CHB shifted modulation is explained in Section-I Section-II explains about cascaded H-bridge Seven and Nine-level inverter configurations. Section-III explains the control strategy and Section-IV presents the simulation results with harmonic analysis. Section-V summarizes the result.

Multi-level inverters are nothing but series connection of single- phase inverters with separate dc sources avoid extra clamping diodes and voltage balancing capacitors. N level cascaded H-bridge inverter consists of series connection of (N-1)/2 of cells in each phase. Four active devices in each cell produce three levels like +Vdc,-Vdc,0 as the number of levels M increases number of active switches required are also increases 2(M-1).[1]

From past few years power consumers like industrial and commercial consumers facing various power quality problems like harmonics and low power factors. Voltage profile is decreasing with tremendous increase of nonlinear loads connected at distribution level. So,the primary target of grid-connected system is to maintain grid current with the same frequency and in phase with grid voltage with less total harmonic distortion (THD).

In recent years, the multilevel inverters have received more attention in both research and high-power applications such as induction motor drives, Uninterrupted power supplies, FACTS and single -phase grid connected systems. As compared to conventional two-level inverters, the multilevel inverters have additional advantages such as low semiconductor voltage stresses, better harmonic performance, low electromagnetic interference ,less number of components and less switching losses.
The common topology for multilevel inverter is full bridge three level converter. The multilevel inverter is able to give a high output power from medium voltage source like batteries, capacitors, renewable energy voltage sources such as photovoltaic, wind, and fuel cells which can be easily interfaced to a multilevel converter system [2]. However, the simple concept of a multilevel converter in turn to achieve higher power is to use a series of power semiconductor switches with several lower voltage dc sources and perform the power conversion by synthesizing a staircase voltage waveform.

In general, Multilevel inverters are classified into three types. They are : 1.Diode clamped multilevel inverter 2. Flying capacitors multilevel inverter 3. Cascaded H- bridge multilevel inverter. those Cascade H-bridge MLI is used in this paper due to following advantages. They are:i. Switching losses and device stress is less .ii. Less number of components are required.iii. Potential of electric shock is very less. iv.Individual DC voltage sources which are available like batteries and fuel cells.

These multilevel inverters consists of series connection of single phase inverters with separate dc sources to avoid extra clamping diodes and voltage balancing capacitors. N level cascaded H-bridge inverter consists of series connection of (N-1)/2 of cells in each phase. Four active devices in each cell produce three levels like +Vdc,-Vdc,0 as the number of levels M increases number of active switches required are also increases 2(M-1).[1]

In diode clamped MLI number of clamping diodes required is increases rapidly as number of levels increases and it is difficult to control the power flow in flying capacitor MLI excess numbers of storage capacitors are required and it is difficult to maintain voltage balance in between capacitors. Now coming to required total number of switches for same level are more in diode clamped and flying capacitor because of clamping diodes and storage capacitors

This paper presents the cascaded H-bridge multilevel inverters for single phase grid connected system and their effects on grid current. Any carrier based PWM is applicable for cascaded H-bridge (CHB). The working of CHB with phase shifted modulation is explained in this paper. The paper is organized as follows. Section II explains Cascaded H-bridges even-level inverter. Section III explains the control strategy and Section IV presents the simulation results with harmonic analysis. Section V summarizes the result.

(2) LITERATURE SURVEY:

Abhil T Balakrishnan et. Al[1] proposed the current study of inverters is used which has more characteristics over other standard topologies in terms of the specified power switches and isolated dc supplies , control requirements ,cost and accuracy. It is observed that this study can be a good credential for converters used in power applications i.e. FACTS,HVDC,PV Systems, UPS etc. In this the switching operation is divided into high and low frequency parts. This leads to

Power-Quality Improvement of a Novel Multilevel Based DSTATCOM

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Abstract-Distribution static compensator (DSTATCOM) is a shunt compensation device that is generally used to solve power quality problems in distribution systems. In an all-electric ship power system, power quality issues arise due to high-energy demand loads such as pulse loads. In this project a new algorithm to generate reference voltage for a distribution static compensator (DSTATCOM) operating in voltage-control mode. Three filter capacitors, one for each phase, are connected in parallel with the DSTATCOM to eliminate high-frequency switching components. The voltage across the filter capacitor is controlled by a dead-beat controller to maintain the AC bus voltage. The magnitude of the bus voltage is chosen as nominal value, i.e., 1.0 p.u., while its phase angle is obtained through a feedback loop that maintains the voltage across the DC storage capacitors. The proposed scheme ensures that unity power factor (UPF) is achieved at the load terminal during nominal operation, which is not possible in the traditional method. Also, the compensator injects lower currents and, therefore, reduces losses in the feeder and voltage-source inverter. Nearly UPF is maintained, while regulating voltage at the load terminal, during load change. The state-space model of DSTATCOM is incorporated with the deadbeat predictive controller for fast load voltage regulation during voltage disturbances. DSTATCOM to tackle power-quality issues by providing power factor correction, harmonic elimination, load balancing, and voltage regulation based on the load requirement and simulation results are presented by using Matlab/Simulink platform.

Index Terms—Current control mode, power quality (PQ), voltage-control mode, voltage-source inverter.

I. INTRODUCTION

Rapid advances in more environmentally-friendly smartgrid technologies are influencing the 21st century leading economies such as the US, China, and Europe to shift from the 20th century electric grid. As these economies become flamboyant and so has the utility of electricity intensified as a catalyst for economic growth among these nations. With transmission and distribution networks still serving as critical link between electric generators and their consumers, the technological sophistication garnered so far does not match the consumer's power quality and reliability demands. Hence, it is about time to transform the current grid (often referred to as "dumb-grid"). The distribution system is relatively perceived as an interface between the bulk and the custom powers, whose control objective is to strike a balance between the two for maintaining continuous healthy operation of the system. A good distribution control system is therefore expected to enhance the overall system efficiency through loss reduction and power quality control. Presently, distribution system equipment such as the tap changing transformers, synchronous machines, capacitor banks, static voltampere-reactive compensators (SVCs), and many other flexible ac transmission systems (FACTS) controllers at device level, including DSTATCOM are being applied for such control. However, there are numerous challenges facing the area at the moment in terms of the smart-grid de-centralizing functionality which include: voltage and reactive power compensation (now known as Volt-VAR optimisation); distribution system automation (DSA); power factor correction (PF); phase current balancing; integrate-able low loss transformers (to improve efficiency), distributed resources (typically, between 1kW - 50MW), and dispersed energy storage facilities (normally sited at consumer loads), which call for radical change in the type of controllers designed in these equipment for general system power quality improvement. Power quality issues, causes, effects and analysis have become an important aspect of research work in recent days. As the power is generated in power stations which are generally far away from load centers, the huge amount of power generated from a generating station is transported to the consumer through transmission lines. The transmission of power from the generating point to the point of consumption is combined with variations of weather, variations in loads, variations in demands etc. which compromises the quality of power. Industrial and commercial consumers of electrical power are becoming increasingly sensitive to power quality problems. Reliability and quality are two important parameters in the field of power engineering. Combining today's utility power with the ever increasing quantity of electrical sensitive load yields one of the major contributors to downtime in business and industries today.

A Novel Method of Fuzzy Controller based DSTATCOM for Power Quality Improvement

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Abstract—In this paper Distribution Static Compensator (DSTATCOM) is implemented for the compensation of reactive power and unbalance caused by the various loads in distribution system. Back Propagation and ILST are the two types of control algorithm used for the extraction of reference source current. The neural network and fuzzy logic are used to design the alternative control schemes for switching the shunt active power filter. By using fuzzy controller instead of pi controller reduction in total harmonic distortion more convenient in real time applications A PI controller is a controller that produces proportional plus integral control action has only one input and one output & output value increases with input value. A fuzzy controller is a generalization of the conventional PI controller that uses an error signal and its derivative as inputs. These schemes are simulated under MATLAB environment using SIMULINK.

Index Terms—Back propagation (BP) control algorithm, harmonics, load balancing, power quality, fuzzy logic control.

I. INTRODUCTION

Both electric utilities and end users of electrical power are becoming increasingly concerned about the quality of electric power. The term power quality has become one of the most prolific buzzword in the power industry. The issue in electricity power sector delivery is not confined to only energy efficiency and environment but more importantly on quality and continuity of supply or power quality and supply quality. Electrical Power quality is the degree of any deviation from the nominal values of the voltage magnitude and frequency. Power quality may also be defined as the degree to which both the utilization and delivery of electric power affects the performance of electrical equipment. From a customer perspective, a power quality problem is defined as any power problem manifested in voltage, current or frequency deviations that result in power failure or disoperation of customer equipment. Power quality is certainly a major concern in the present era, it becomes especially important with the introduction of sophisticated devices, whose performance is very sensitive to the quality of power supply. Modern industrial processes are based a large amount of electronic devices such as programmable logic controllers and adjustable speed drives. The electronic devices are very sensitive to disturbances and thus industrial loads become less tolerant to power quality problems such as voltage dips, voltage swells, harmonics, flickers, interruptions and notches.

II. SYSTEM CONFIGURATION

The D-STATCOM is a three-phase and shunt connectedpower electronics based device. It is connected near the loadat the distribution systems. The major components of a DSTATCOMare shown in Fig 1.

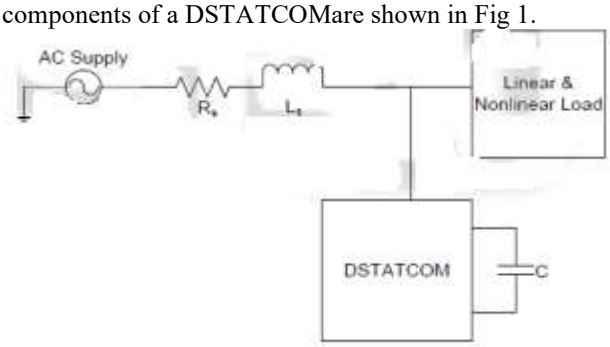

Fig.1. Basic building blocks of DSTATCOM.

It consists of a dc capacitor, three-phase convertermodule, ac filter, coupling transformer and a controlstrategy. The basic electronic block of the DSTATCOM isthe voltage sourced converter that converts an input dcvoltage into a three phase output voltage at fundamentalfrequency. The controller of the D-STATCOM is used tooperate the inverter in such a way that the phase anglebetween the inverter voltage and the line voltage isdynamically adjusted so that the DSTATCOM generates orabsorbs the desired VAR at the point of connection.

III. SYSTEM CONFIGURATION AND CONTROL ALGORITHM

A voltage source converter (VSC)-based DSTATCOM is connected to a three phase ac mains feeding three phase linear/nonlinear loads with internal grid impedance which is shown in Fig. 2. The performance of DSTATCOM depends upon the accuracy of harmonic current detection. For reducing ripple in compensating currents, the tuned values of interfacing inductors (Lf) are connected at the ac output of the VSC. A three phase series combination of capacitor (Cf) and a resistor (R_f) represents the shunt

Improvement of Power Quality by using Dynamic Voltage Restorer Performance for Induction Motor Drives

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ABSTRACT

Electronic devices function properly as long as the voltage of the supply system feeding the device stays within a consistent range. There are different types of voltage fluctuations that can cause Power quality problems, including, sags, harmonic distortions, surges and spikes and momentary disruptions, nonstandard voltage, current or frequency that results in a failure or miss operation of end user equipment. The steady-state PQ characteristics of the supply voltage include surges and spikes. Voltage sags and swells are the common events on the electric power network. Voltage sags and swells are the common events on the electric power system. The common causes of voltage sag are short circuit or faults in power system, at starting of large loads and faulty conductor. These problems can be mitigated with voltage injection method using custom power device, Dynamic Voltage Restorer (DVR). A DVR is connected in series with the linear load to compensate for the harmonics and unbalance in the source voltages and improve the power factor on the source side A series connected converter based mitigation device, the Dynamic Voltage Restorer(DVR), is the most economical and technically advanced mitigation device proposed to protect sensitive loads from voltage sags. In this paper, DVR which consists of injection transformer, filter unit, Pulse Width Modulation (PWM) inverter, energy storage and control system is used to mitigate the voltage flickers in the power distribution system. Here we propose two control techniques which are the Proportional Integral (PI) Controller and Fuzzy Logic (FL)

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Simulation of Fuzzy Logic Controller Based Four Phase Switched Reluctance Motor

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ABSTRACT

The switched reluctance motor drives has evolved as an alternative to conventional motors in variable speed drives because of advantages like simple and rugged structure, absence of rotor winding, adaptability to harsh environments like coal mining, high speed operation etc. Because of nonlinearity, torque ripple is high in the motor. Switched reluctance motors (SRM) have many advantageous characteristics comparing to those of the conventional AC and DC machines. The mechanical simplicity in construction of the SRM can be seen through their purely laminated-steel structure without permanent magnets, rotor windings and squirrel-cage bars. Thus, SR machines offer high reliability and robustness in operation. The Switched Reluctance Motor (SRM) has highly gains interested in many industrial applications. On the other hand the SRM also have the disadvantage points such as high torque ripple and nonlinearity characteristic. This paper presents the development of the drive system for a four-phase 8/6 switched reluctance motor with fuzzy logic controller for testing and obtaining characteristics of the SRM.By using MATLAB/SIMULINK software.

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IOT Industry Protection System Arduino

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Abstract:
Internet of Things (IoT) plays a key role in the new generation of industrial automation systems.The proposed system develops a sensor interface device essential for sensor data acquisition of industrialWireless Sensor Networks (WSN) in Internet of Things (IoT) environment.The IOT industry protection system using Arduino is a system designed to protect industries from losses due to accidents using Internet of things. Gas leakages may lead to fires leading to huge industrial losses, also instant fire detection is needed in case of furnace blasts or other conditions. Also low lighting in industries may create improper work conditions increasing the probability of accidents. The system makes use of Arduino to achieve this functionality. The system makes use of temperature sensing along with light gas sensing to detect fire, gas leakage as well as low lighting to avoid any industrial accidents and prevent losses. The system consists of light, gas and temperature sensors interfaced with arduino and LCD screen. The sensor data is constantly scanned to record values and check for fire, gas leakage or low light and then this data is transmitted online. The wifi module is used to achieve internet functionality. The ThingSpeak/Blynk server then displays this information online, to achieve the desired output.

Keywords: Arduino Nano, IoT, ESP01 Wifi Module, LDR Sensor, LPG CNG Gas Sensor, Temperature Sensor LM 35, Fire sensor, Arduino IDE, Blynk application

I. Introduction:

Industries like Petroleum, Chemicals, Oil, and Gas have a high risk of fire outbreaks which could lead to huge destruction, loss of property and most of all, loss of lives. As we are making use of Internet the system becomes secured and live data monitoring is also possible using IoT system.It is very important to have some system that can keep the premises secure and also inform the authorized people within the stipulated time if such an incident takes place. IOT and Arduino based Industrial fault detection project is designed to detect fire (using smoke and temperature sensor) and LPG leakage (using LPG gas sensor). This project uses IOT and sends information to a website. Internet of Things (IoT) is basically, the network of 'things' by which physical things can exchange data with the help of sensors, electronics, software, and connectivity. These systems do not require any human interaction[1].We can implement sensors in wide area over the machines and instruments and control and monitor the circumstances by using concept of IoT. The terms of "things" in the IoT vision is very broad and includes a variety of physical elements. The terms of things include portable personal items such as smart phones, tablets and digital cameras. Furthermore, IoT includes elements of our environments (be it home, car or office), and things equipped with RFID tags connected to a gateway device. From those mentioned so far, a huge number of devices and things will be connected to the Internet, each providing data and information and some even services. With the rapid increase in the number of user of the internet over the pass decades made the internet as the part of the life and IoT is the latest and emerging technology[2]. Thus, it will scan information in parallel and in real time with high speed on multiple completely differentdevice information. Intelligent device interface specification is adopted for this style. By detecting the values of sensors itcan easily find out the Temperature, humidity, and gas present in the industrial area. And also it controls the power withabnormalities. So that critical situation can be avoided and preventive measures are successfully implemented.

II. Literature review:

Along with the availability of massive amount of processing power provided by the Cloud new opportunities have emerged for complete automation of industrial devices. IoT has a vast application in

A smart digital home with security, safety and power monitoring.

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Abstract:

A smart home is a residence that uses internet-connected devices to enable the remote monitoring and management of appliances and systems, such as lighting and heating. Smart home technology, also often referred to as home automation or domotics (from the Latin "domus" meaning home), provides homeowners security, comfort, convenience and energy efficiency by allowing them to control smart devices, often by a smart home app on their smartphone or other networked device. A part of the internet of things (IoT), smart home systems and devices often operate together, sharing consumer usage data among themselves and automating actions based on the homeowners' preferences. One of the most touted benefits of home automation is providing peace of mind to homeowners, allowing them to monitor their homes remotely, countering dangers such as a forgotten coffee maker left on or a front door left unlocked. In this project, we designed smart digital home with different applications. IR based security alarm circuit with Arduino can detect any movement by adding two IR sensors. Water level sensor is used to measure water level in water tank or in any other equipment. LM35 sensor can sense the temperature it is put around and transmit it to degrees Celsius. This project consists of a LM35 Temperature Sensor which is the most often used.In this project, we can measure voltages using Arduino by interfacing a Voltage Sensor with Arduino. Using this Arduino Voltage Sensor interface, you can measure voltages up to 25V. By using current sensor device to make the decisions regarding safety in over current protection circuits. All this real time information can be monitored using LCD display.

Keywords: IR sensors, Buzzer, Arduino board, Temperature sensor, Voltage sensor ,Current sensor, Water level sensor, Embedded C, Arduino IDE

1.Introduction:

Domotics are also beneficial for the elderly, providing monitoring that can help seniors to remain at home comfortably and safely, rather than moving to a nursing home or requiring 24/7 home care. Smart homes can accommodate user preferences for convenience. For example, user's can program their garage door to open, the lights to go on, the fireplace to turn on and their favorite tunes to play upon their arrival[1]. Home automation also helps consumers improve efficiency. Instead of leaving the air conditioning on all day, a smart home system can learn behaviors and make sure the house is cooled down by the time homeowners arrive home from work. The same goes for appliances.

With a smart irrigation system, the lawn will only be watered when needed and with the exact amount of water necessary. With home automation, energy, water and other resources are used more efficiently, which helps save both natural resources and money for the consumer. For home automation systems to be

Hybrid Electric Vehicle System With DC/DC Converter Energy Storage

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ABSTRACT

This study develops a newly designed, patented, bi directional dc/dc converter (BDC) that interfaces a 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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Power Quality Improvement In Distribution System By Using Dual Voltage Source Inverter

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ABSTRACT

This paper presents a dual voltage source inverter (DVSI) scheme to enhance the power quality and reliability of the microgrid system. The proposed scheme is comprised of two inverters, which enables the microgrid to exchange power generated by the distributed energy resources (DERs) and also to compensate the local unbalanced and nonlinear load. The control algorithms are developed based on instantaneous symmetrical component theory (ISCT) to operate DVSI in grid sharing and grid injecting modes. The proposed scheme has increased reliability, lower bandwidth requirement of the main inverter, lower cost due to reduction in filter size, and better utilization of microgrid power while using reduced dc-link voltage rating for the main inverter. These features make the DVSI scheme a promising option for microgrid supplying sensitive loads. The topology and control algorithm are validated through extensive simulation and experimental results.

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Reduction of Steady State Ripple of Vector Controlled Induction Motor Drives by Combining the Techniques of FOC and DTC

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ABSTRACT

To reduce the disadvantages of the existing Methods of field oriented control and direct torque control algorithms, the proposed method of the vector control algorithm mix the ideology of mutually field oriented control as well as direct torque control. The proposed algorithms generate the d-axis plus q-axes current references with the theory of existing field oriented control. As a result, by evaluate the current references as well as the actual currents error present signal is produced. As a result of with the error signals along with the lookup-tables, and the appropriate voltage vector will be chosen based on the theory of the direct torque control. Hence, the proposed method reduces the complexity when evaluated through the field oriented control as well as decreases the stable condition of the torque swells, when evaluate with the direct torque control method. So In this article, propose a 6-sector, 12-sector and 24-sector based lookup-tables designed for the vector control algorithm. The Mat-Lab-simulation results are exhibits the efficiency of the proposed techniques.

Keywords
Direct Torque Control (DTC), Field Oriented Control (FOC), vector control algorithm, lookup-table.

I. INTRODUCTION

In the present days asynchronous motors are uses in variable-speed drives appliance because of with a reduction of maintenance as well as lesser weight to volume proportion. So many existing algorithms are developed for the speed-control of motor drives. One of the existing algorithms is the scalar control, and also identified as the volts/hertz control method is easy for the execution. But, the main disadvantage of the scalar control offer slow reaction due to the coupling consequence flanked by the torque along with flux. To attain the decoupling controller in asynchronous motor drive related to the separately excited dc motor method, FOC method, and also known as vector based control method have been proposed [2]. The development of the field oriented control brings resumption in the field of the ac related drives. Afterward, a lot of enhancements have been proposed for the field oriented control [3]-[5]. The field oriented control offers quick transient response due to the decoupled control of torque as well as flux. Although, the field oriented control provides high-quality transient retort, the complexity taken addicted to more due to the revolution of reference framework.

To reduce the complexity worried in field oriented control (FOC), in the year 1980s, Takahashi expand proposed DTC method for motor drives [6]. The direct torque control (DTC), is simple for the suitable performance as well as it sprightly control the mutually torque as well as flux. It utilizes two hysteresis types of comparators designed for torque as well as flux loops along with a lookup-table for the selection of right voltage vector Method. However, the direct torque control method provides quick dynamic reaction related to that of field oriented control method, it presents massive stable condition deviation in current values, torque characteristics, and flux characteristics. A total evaluation involving field oriented control method as well as direct torque control method has been presented [7]. Additionally, the advantages and disadvantages of field oriented control method as well as direct torque control method are discussed. To reduce the complexity concerned in current controlled drives suitable to the transformation of reference framework, a

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Simulation of Solar cell Based Multilevel Inverter for Induction Motor Applications

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ABSTRACT

The RES systems like wind Renewable energy sources, solar Renewable energy sources along with Energy obtained from water source are observed as a dependable substitute to the Existing energy resources like oil, natural gas and coal. Distributed Electrical Transmission method is depended on RES undergoes large scale growth across the world. As a Result, the control of distribution generation scheme should be enhanced to satisfy the necessities for grid interconnection. This paper explains the growth of a control design in favor of grid tied inverters of RES. In this proposed concept HCC controller is used as a controller of the system. In the proposed controller the inverter with Induction Motor drive Load current is essential towards the allow the grid connected voltage in provisions of the regular intervals of the time. The Ig is calculated, along with contrasted through the Ir is in form of the unit sine waveform attained as of the grid along with the sine-pulses are produces the error among the authentic current and the grid of Load current. And the delivered power of the grid is increased as the Direct Current linkage of the voltage also increases. The converter will be experienced on grid interface on the rotor surface of an induction Motor generator. The Proposed technique is fed to a induction motor drive as well as the shows the motor speed characteristics, Torque characteristics and Stator Current characteristics is analyzed by using Matlab/Simulink software.

Keywords
Renewable energy sources (RES), Hysteresis Current Control (HCC), Distribution Network, Induction Generator, Reactive Power, Harmonics, and Power Quality.

I. INTRODUCTION

In the last few years, Inverters (MLI's) has gain consideration due towards the broad appliance in distributed systems along with the Industrial Motor drives. The improved sinusoidal sine waveform of the ac output commencing dc resources similar to batteries, Photovoltaic cells. Etc is to be attaining from Multi-Level Inverters. In the ac output be able to directly interface towards the load through the little filter circuits is in the output [1].

In the stairway waveforms are able to produce from several input DC supply feed toward a Multi-Level Inverters. Multi-Level Inverters' stair waveforms depict an improved harmonic report. The main limits of Multi-Level Inverters are constraints of huge No. of Switches are used along with connected driver circuits. Now a day's Electricity is widely used in everywhere in the world. So the applicants are want to be used Quality Power. There are several types of energy's are available in the world. Electricity is the basic need of the people, which is used as household purposes, industrial applications and Domestic applications. Renewable Energy sources are used for generation of the Electricity because of Free Environment and for future generations. In solar Photovoltaic method is one of the finest techniques is to produce Electricity. In recent developments photovoltaic (solar) has to be delivering the constant power than moreover entity supply.

In Distribution systems, the supply of the primary consumers is to be resolved with the economical conditions, eco-friendly, improvement of Power quality and the high reliability conditions. So in this paper we developed a generation system with the combination of fuel cells, solar cell and also backup with the battery Banks. And the definition of the generating systems in distributed Generation is a supply of little electrical power is linked to a network or circuit. Industrial development now allows Electrical power system to be built in less essential amount through far above the ground efficiency, economical, and Eco-friendly. In the Electrical Power electronics have misused quickly through the last thirty years as well as the number of requests has been rising, essentially suitable toward the growth of the semiconductor devices as well as the microprocessor. A summary of dissimilar power strategies as well as the region where the expansion is still obtainable on is shown in Figure.1 [1]. The fed of the voltage source converter drives are

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Research Article

Analysis and Recognition of Animals in Zoo Using Transform based techniques

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Abstract: An object recognition system identifies an object which is under test by comparing different features of the test and training database images. This task is difficult for computers, however for human's object recognition is effortless and instantaneous. The various applications for object recognition are in the fields of Medicine, Communications, Military Intelligence, Bioinformatics and many others. It is the ability to perceive an object's physical properties such as shape, colour and texture and apply semantic attributes to the object, which includes the understanding of its use, previous experience with the object and how it relates to others. Algorithmic description of this task for implementation on machines has been very difficult. Humans recognize a multitude of objects in images with little effort, despite the fact that the image of the objects may vary somewhat in different viewpoints, in many different sizes and scales or even when they are translated or rotated. Many approaches to this task have been implemented over decades, but still, this is an open area of research. There are standard databases available for research in the area of object recognition. In this proposed work, the images of the different animals are downloaded from https://www.rocq.inria.fr/gamma/gamma/download/ANIMALS/index0.php and 3D Meshes Research Database. These images are to be converted into binary form, by using thresholding method. In the next step, distinguishable features which may be Zone based, Transform based or Statistical in nature are to be extracted from these images. Using these features, animals (in the present work) can be recognized by using various classifiers such as SVM, Neural Networks and NNC (Nearest Neighbourhood Classifier) namely 'Euclidean Distance'. The execution time of the simulation would also be compared for all the transforms implemented in the work. The results obtained would be compared with the existing results of similar work

Keywords: Nearest Neighbourhood Classifier, Euclidean Distance, Military Intelligence

1. Introduction

An object recognition system finds objects in the real world from an image of the world, using object models which are known to the system earlier. This task is surprisingly difficult. Humans perform object recognition effortlessly and instantaneously. It is the ability to perceive an object's physical properties (such as shape and colour) and apply semantic attributes to the object, which includes the understanding of its use, previous experience with the object and how it relates to others. Algorithmic description of this task for implementation on machines has been very difficult. Humans recognize a multitude of objects in images with little effort, despite the fact that the image of the objects may vary somewhat in different viewpoints, in many different sizes and scales or even when they are translated or rotated. Objects can even be recognized when they are partially obstructed from view. This task is still a challenge for computer vision systems. Many approaches to the task have been implemented over multiple decades.

Object recognition is concerned with determining the identity of an object being observed in the image from a set of known labels. It is assumed that the object being observed has been detected or there is a single object in the image.

2. Methodology and Block Diagram

2.1 Introduction

In this chapter, the methodology adopted for the proposed method is discussed. The step by step algorithm is discussed in detail and the various operations on the images are also elaborated.

2.2 Block Diagram for Recognition of Animals

The image pertaining to animals from a standard database are downloaded. The downloaded colour images of the animals are of the size 600*600 pixels. There are totally 600*600=36000 pixels in each image of the animal. After the colour image is converted into grayscale image using MATLAB, the intensity values of different pixels range from 0 to 255. These images are binarized using thresholding concept with various values ranging as 0.50,

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Research Article

Analysis and Identification of Aeroplane Images Using Transform Based Methods

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Abstract: Object recognition is one of oldest applications of automatic pattern recognition. The object recognition has generated lot of interest among researchers for a variety of applications like face detection, people counting, vehicle detection, manufacturing industry, online images, security etc. The main objective of this work is to recognize aeroplanes, even if they are of different size (different scale) or even if they are Oriented with different skew angles. This work would be useful in tracking an aircraft for navigation applications. Further the identification of aeroplanes can be used in military applications to detect the enemy aircrafts.

To achieve these objectives, the main challenge is the different shape, size and orientation of aircrafts which pose difficulty in the object recognition. In this work, an aeroplane is identified by extracting and comparing features between the test and training database images. This task is difficult for computers, however for humans; object recognition is effortless and instantaneous. In the first stage, the images of different aeroplanes and helicopters are selected and these images are downloaded from the web page "www.grabcad.com". These images are grouped into two sets. The first set comprises database images which are used for training the system, whereas the second set is used for testing and obtaining the recognition accuracy for different algorithms. All these images are normalized and binarized using the thresholding concept.

In the second stage, 2D- Transforms (2D-FFT and 2D-Hough Transform) are applied to all the pixels of these binarised images (both testing and training database). After applying the transform, the pixel intensity value will have both, the real and also the imaginary values. Since the imaginary values of the pixel, has only "phase information", which is not useful in the recognition of aeroplanes, this imaginary value of all the pixels in all the images are neglected.

The real part of the pixel intensity values (after applying the transform) is only considered for recognition. In this work, all the images are normalized to 50 X 50 size and hence the total number of pixels becomes 2500 for every image. The size of the matrix of each image (both test and database) is converted to (2500 X 1) column matrix from 50 X 50 matrix size. Hence after applying 2D transforms each image is of matrix size (2500 X 1). This matrix of (2500 X 1) size for each image (both testing and training), becomes the feature vector for that particular image. This process is applied to all the images and the features are extracted for all the test and database images.

In the third and the last stage, k-NN (k Nearest Neighbourhood) classifier is used in the identification of an aeroplane. The k-NN classifier with k=1 is the Euclidean distance. Hence, the recognition is achieved by calculating and identifying a database image which has minimum Euclidean distance to the given test image. The test image is shown on the left side of the result image, whereas the identified image of the database is shown on the right side of the result image. The cross validation of the results is also performed in this work. The Recognition accuracy with 2D-FFT is obtained as 88% and the Recognition accuracy with 2D-Hough transform is found to be 82%.

The reason for this difference can be because of the reason that, Hough transforms works on the principle of detection of straight lines in any image. Hence it can be concluded that 2D-FFT has higher Recognition accuracy compared to 2D-Hough transform.

Keywords: k-NN (k Nearest Neighbourhood), 2D- Transforms (2D-FFT and 2D-Hough Transform), phase information.

1. Introduction

In this chapter, the methodology adopted of the proposed method is discussed using block diagram. The block diagram for recognition of aeroplane is discussed in detail and the various operations on the images are also elaborated. The procedure for cross validation of results is also discussed in detail. The key objective is to develop Object recognition techniques which are efficient and less complex. The primary step is to collect the images of aeroplane and divide them into test images and training images. In this project there are 200 training images and 50 test images. In the 50 test images, there 35 aeroplane images and 15 helicopter images. The images are color images and are of different sizes, all the images are stored in JPEG format.

In the pre-processing stage, all the images are selected, cropped, binarized and finally they are normalized to a size of 50 X 50. The color images are conveted to binary images by using Photoshop tool by minimum rectangle

Solar based Electric Vehicle Charging and Parking monitoring System using IoT technology

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Abstract:
Now-a-days, we are facing problems related to low fuel. So, we are choosing an electrical vehicle. Plug-in electric vehicles are slowly becoming permanent options for consumer use as regular transportation. Charging solutions which are both intelligent and renewable are required to meet the challenges of coordinating these into the present power grid and future smart grid. A solar photovoltaic parking structure for charging these vehicles is invented and executed that shows on-site power storage, a grid connection to a nearby apartments, and coordination with the local utility through demand response. Computer-based intelligent power management is explained by expert control of the sources, loads, and storage devices. But now people will refuse to prefer electrical vehicle than present ones. It is because of cost as well as less available charging stations. Even though there are few charging stations are available, it is mandatory to spend extra time to charge a vehicle. So, these issues provide a smart parking with charging facility to most of commercial apartments. Thereforereduction in the efforts of finding for placefor parking. Also, we find less time forsearching charging station and for charging at charging station. Proposed method is implemented by visual analysis and performance results shows that this method on electric vehicle is improved by using IoT based technology. Therefore, this article explains the need and need of starting electric vehicles with IoT based technology which examines the battery life of electric vehicles. Since the electric vehicles are related with internet, an online monitoring system which is called Things Speak which is used for monitoring all the vehicles in a continuous manner (day by day)
Key words: Plug-in electric vehicles, Computer-based intelligent power management

(I) INTRODUCTION:

The use of Internet of Things (IoT) has created a new platform in wireless technologies firstly in the field of making electric vehicles. To reduce this type of problems in existing vehicles and for secure environment, electric vehicles must be placed by coordinating an intelligent device called sensor must be placed in all locations of electric vehicle without high cost. At present Electrical vehicle is a trending news and it is also an important part of this new world. Disadvantage of electric vehicles is cruising range is less. So, it requires frequent recharging. we know that we have less fuel on our earth so it is time that we prefer electric vehicles. For charging the electric vehicles, presently used charging method is plug in charging, this method has of a plug which is connected to the vehicle for charging. Electrical vehicles need a charging station like that of current fuel car need a petrol pump and obviously chargingtakes some time so it is good to charge the car when it is parked, therefore it is easy to combine both the charging and parking system which is based on the IoT technology which makes the system easy. One can upload data on cloud and simultaneously on smart phones. So, With the help of IoT, it is easy to monitor vehicle parking as well as charging of vehicles when they are parked at the same time that means it helps in synchronized parking. Another important factor of using IoT is we can store data on cloud that we can access anytime from anywhere, which makes life easy and simple.

Now -a-days there are more changes in vehicle manufacturing, where all companies are already in production of vehicles and they are moving towards a smart vehicle environment. Thus, the use of old engines have been replaced by new ones that produces much less problems to the environment. In this way, electric vehicles which produce much less pollution are introduced with many facilities which are near to normal vehicles that are present now. The

Closed-Loop High-Step up Converter with Soft Switching in PV Systems

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ABSTRACT:

In the last several years, with the tension of global fossil energy, the renewable energy power systems, which are mainly on the photovoltaic (PV) power systems, are developing rapidly. In a PV power system, the output voltages of the PV panels are usually low and vary widely under the influences of weather and environment. The unregulated low voltage of PV panels, which cannot be provided for inverters, must be boosted and regulated through the high-gain converters. In this paper, a new High Step up DC-DC Converter is introduced for application in PV systems. The provided topology includes a boost converter using coupled inductors to increase the voltage gain. The only switch on this Converter is switched under Zero- Current Switching (ZCS), and also, all the diodes are switched on and off less than Zero-Current Switching. The voltage stress on the switch and all the diodes is much lower than the output voltage, and this makes the efficiency of this converter higher. The simulation model and the results are analyzed using MATLAB/Simulink.

Keywords: Photovoltaic (PV), High Step up DC-DC Converter, Zero-Current Switching.

(1) Introduction

Energy generation, transmission and distribution are undergoing profound changes with the emergence of localized grids in favour of a centralized grid. Whatever the reason: disaster mitigation, energy independence or financial gain, they all subscribe to and advance the separation from a central grid. And, it is happening across all sectors, from residential to commercial, communities to nations and urban to rural. These localized grids – minigrids, Micro grids, nanogrids and picogrids – however are not just miniaturizations of the grid as we know it. They are more in tune with today's energy and how it is used. And, not just the use, but also the generation, as diverse energy sources become more technologically available and affordable. According to the emerge Alliance, 80% of all AC electricity is now being used by DC based power electronics [1] heralding the change to energy sources that don't incur significant conversion losses at the point of use.

The general term of these localized grids, Microgrids [2], can be divided into AC and DC. However, the problems associated with AC Microgrids – synchronization of generators, reactive power and line unbalances, as well as their energy losses when converting to DC, favours the move to the DC microgrid. Such DC Microgrids may include AC and DC loads, dispatch able and non-dispatch able generators, energy storage, common distribution, management and demand response, and, a tether to the grid, where available, for increased reliability of service.

Renewable energy sources play an important role inelectricity generation. The benefits of renewable energysystem are more attractive than they ever had before.Specially, energy from the sun is the best option forelectricity generation as it is available everywhere and isfree to harness. The merits of solar PV system are cleanness,relative lack of noise or movement, as well as their ease ofinstallation and integration when compared to others.Electricity from the sun can be generated through the solarphotovoltaic modules (SPV). The SPV comes in variouspower output to meet the load [1]. However, the outputpower of a PV panel is largely determined by the solarirradiation and the temperature of the panel. At a certainweather condition, the output power of a PV panel dependson the terminal voltage of the system. To maximize thepower output of the PV system, a high efficiency, low-costDC/DC converter with a voltage and current feedback signalis employed to control the output voltage of the PV systemat

A Novel Method of CHB Five Level STATCOM Based Multilevel Inverter

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Abstract- ***This paper presents a special gating pattern swapping technique for cascaded multilevel inverter, which is used for STATCOM. By using this technique besides minimizing the harmonic level, the inverter unit fundamental output voltages are, equalized. Therefore, all the inverter units in each phase leg can equally share the exchanged active and reactive power with the utility grid. This greatly helps the dc-link voltages balancing control. PI Control is employed for improving performance. The dc-link voltages of the inverters are regulated at different levels to obtain four-level operation. In this paper five level STATCOM based CHB multilevel inverter by using MATLAB/SIMULATION software. The simulation study is carried out in MATLAB/SIMULINK to predict the performance of the proposed scheme under balanced and unbalanced supply-voltage conditions.***

Index Term s —DC-link voltage balance, multilevel inverter, Power quality (PQ), static compensator (STATCOM).

I. INTRODUCTION

The rapid growth in electrical energy use, combined with demand for low cost energy, has gradually led to the development of generation sites remotely located from the load center. The generation of bulk power at remote locations necessitates the use of transmission line to connect generation sites to load centers. With long distance ac power transmission and load growth, active control of reactive power is indispensable to stabilize the power system and to maintain the supply voltage. The static synchronous compensator (STATCOM) using voltage source inverters has been accepted as a competitive alternative to the conventional Static VAr compensator (SVC) using thyristor-controlled reactors STATCOM functions as a synchronous voltage source. It can provide reactive power compensation without the dependence on the ac system voltage. By controlling the reactive power, a STATCOM can stabilize the power system, increase the maximum active power flow and regulate the line voltages. Faster response makes STATCOM suitable for continuous power flow control and power system stability improvement. The interaction between the AC system voltage and the inverter-composed voltage provides the control of the STATCOM var output [7] [8]. When these two voltages are synchronized and have the same amplitude, the active and reactive power outputs are zero.

In conventional cascaded multilevel inverter use fundamental switching frequency [2] to generate step waveform at low harmonic distortion and keep the switching loss as low as possible. But the inverter units' duty cycles are different from each other. Due to unequal duty cycle the inverter units cannot equally share the exchanged power with the utility grid [3]. In STATCOM to balance [5] the dc-link voltages, additional auxiliary inverters were used to exchange the energy among various capacitors. But the disadvantage is high cost and complexity in hardware design. In [2], to eliminate unequal duty cycles, the required dc capacitance of each inverter unit is calculated according to the corresponding duty cycle. But in practical application modular design is very difficult. By using proposed method inverter units' fundamental output voltage are equalized. Consequently, all the inverter units can equally share the exchanged power with the utility grid, and the dc-link voltage balancing control can be simplified. A special gating pattern is used for maintain the dc capacitor charge balance and equalize the current stress of the switching device.

In this paper, a static var compensation scheme is proposed for a cascaded two-level inverter-based multilevel inverter. The topology uses standard two-level inverters to achieve multilevel operation. The dc-link voltages of the inverters are regulated at asymmetrical levels to obtain four-level operation. To verify the efficacy of the proposed control strategy, the simulation study is carried out for balanced and unbalanced supply-voltage conditions.

II. CASCADED TWO-LEVEL INVERTER-BASED MULTILEVEL STATCOM.

Fig. 2 shows the circuit topology of the cascaded two-level inverter-based multilevel STATCOM using standard two-level inverters. The inverters are connected on the low-voltage (LV) side of the transformer and the high-voltage (HV) side is connected to the grid. The dc-link voltages of the inverters are maintained constant and modulation indices are controlled to achieve the required objective. The proposed control scheme is derived from the ac side of the equivalent circuit which is shown in Fig.3. In the figure, v_a', v_b' and v_c' are the source voltages referred to LV side of the transformer r_a, r_b, and r_c are the

Simulation of BLDC Motor by using Fuzzy Based Bridgeless Buck-Boost Converter

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Abstract - This paper shows another PFC bridgeless (BL) buck–boost converter for brushless direct current (BLDC) engine drive application in low -control applications. A Fuzzy logic execution in adaptable speed control of BLDC engine is done here. A methodology of rate control of the BLDC engine by controlling the dc bus voltage of the voltage source inverter (VSI) is utilized with a solitary voltage sensor. The controller is intended to track varieties of pace references and settles the yield velocity amid burden varieties. The BLDC has a few preferences contrast with the other kind of engines; however the nonlinearity of the BLDC engine drive attributes, in light of the fact that it is hard to handle by utilizing customary relative basic (PI) controller. So as to tackle this fundamental issue, the Fuzzy logic control turns into a suitable control. To give an inborn PFC at supply ac mains a converter based on buck-boost type is intended to work in broken inductor current mode (DICM). The execution of the proposed commute is mimicked in MATLAB/Simulink environment .

Keywords: Bridgeless (BL) Buck–Boost Converter, Brushless Direct Current (BLDC) Motor, Discontinuous Inductor Current Mode (DICM), Power Factor Corrected (PFC), Power Quality.

I. INTRODUCTION

The bidirectional dc-dc converter is also known as buck boost converter, which has more applications such as controlled battery charging. The dc-dc converters are being increasingly used to achieve power transfer between two dc power sources in either direction [1]. The dc-dc converter can be categorized in to buck, boost and buck boost types which are of low cost, compact in size, without transformer and easy to control due to common ground. There are number of variations of this basic Buck-Boost circuit, some designs work at lower frequencies or at high voltages which may use bipolar transistors instead of MOSFET [2]. In this paper a bidirectional dc/dc converter will be developed to control power flow between the battery and BLDC motor, hence the desired control variables are both output current and voltage. The proposed bidirectional buck-boost converters are applicable in energy storage based on battery applications. Brushless DC (BLDC) motors are becoming more popular in industrial and traction applications. This motor has less inertia, therefore it is easier to start and stop the motor. BLDC motors are potentially clean, fast, less noisy, more efficient and more [3]. The Brushless DC motor is driven by rectangular or trapezoidal voltage strokes which is coupled with the given rotor position. The voltages stroke must be properly aligned in the phases, so that the angle between the stator flux and the rotor flux is kept closer to 90° in order to get the maximum torque. The actual rotor position of BLDC motor can be detected without sensors but it often incorporates internal or external position sensors to sense the position. When the acceleration command is issued, the electric machine is operated in the motor mode. Output torque of the motor is controlled by a voltage source inverter (VSI) by adjusting the direction and amplitude of the phase current. If the input phase voltage is in phase with back EMF, motoring torque is developed and when the input current is out of phase with back EMF, braking torque is developed [4]. The regenerative braking refers to charge a battery using back EMF voltage of the motor. In this paper fuzzy logic controller is used for controlling the speed of brushless DC motor using bidirectional converter [5]-[6]. BLDC motor has a wide range of speed hence speed control is very important issue for it. The efficient speed control mechanism for the motor is done using meaningful fuzzy sets and rules.

This paper presents a BL buck–boost converter fed BLDC motor drive with variable dc link voltage of VSI for imp roved power quality at ac mains with reduced components and superior control

II. PRINCIPLE OF BLDC MOTOR

BLDC engine comprises of the perpetual magnet rotor and an injury stator. The brushless engines are controlled utilizing a three stage inverter. The engine obliges a rotor position sensor for beginning and for giving legitimate compensation arrangement to turn on the force gadgets in the inverter extension. In light of the rotor position, the force gadgets are commutated consecutively every 60 degrees. The electronic compensation takes out the issues connected with the brush and the commutator plan, in particular starting and destroying of the commutator brush course of action, along these lines, making a BLDC engine more rough contrasted with a dc engine. Fig.1 demonstrates the stator of the BLDC engine and fig.2 shows rotor magnet plans.

Improvement of Power Quality by using Dynamic Voltage Restorer Based Super Capacitor for Industrial Applications

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ABSTRACT

In modern power distribution systems power quality is considered as a major factor. For the fulfillment of industrial goals, modern industries are looking forward for new innovative technologies. The key requirement in any utility work is a disturbance free continuous power supply. The high quality power generated at the power stations are not delivered in the same form at the utility centers. This is mainly because of the widespread use of power electronic devices which introduced harmonics and other nonlinearities to the systems. The paper describes the application of super capacitor energy storage system for induction traction drive test bench that replaces a real electric public transport for performing testing and researches. The suitability and usage of such bench for research purposes is explained and the importance of the development of software mathematical model for performing simulations to be done before physical implementation measures is reasoned. The working principle of the bench and applied components are described. A virtual model of the bench was built and simulations were performed using Matlab/Simulink software. This concept results shows the superiority of the developed topology in voltage compensation capability and reliability. The proposed DVR has provided a regulated and sinusoidal voltage across the sensitive load.

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Maximum Power Point Tracking for PV System under Partial Shading Condition via Particle Swarm Optimization

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Abstract:

The performance of Photovoltaic (PV) system is greatly dependent on the solar irradiation and temperature. Due to partial shading condition, the characteristics of a PV system considerable change and it exhibits different local maxima with one global maxima. Conventional Maximum Power Point Tracking (MPPT) techniques are used to trap the local maxima under partial shading. This significantly reduced the energy yield of the PV systems. In order to solve this problem, a Maximum Power Point tracking algorithm based on particle swarm optimization (PSO) that is capable of tracking global MPP under partial shaded conditions. The performance of proposed algorithm is evaluated by means of simulation in MATLAB Simulink. The proposed algorithm is applied to a grid connected PV system, in which a Boost (step up) DC-DC converter satisfactorily tracks the global peak.

Key words: Maximum Power Point Tracking (MPPT), Photovoltaic (PV), particle swarm optimization (PSO)

(1) Introduction

Now-a-day large and small scale, PV power systems have been commercialized in many countries due to its potential in long term benefits, in tariff schemes and many other attractive initiatives provided by the governments to promote sustainable green energy. PV systems can be used in a wide range of applications from power supply for satellite communications to large solar power stations feeding electricity into the grid. The grid connected PV power system has a very large commercial potential. A major problem is in PV system is the varient effects of the PV output due to broken parts or partial shading of the modules. This may result of sudden cloud changes in the sky, trees, poles, obstruction of buildings etc. An efficient PV system should be operated optimally in all conditions including during partial shading.

Generally, a grid connected PV system is operated with a dc–dc power converter in order to track the instantaneous Maximum Power Point (MPP) of the PV source. Many MPP tracking techniques have been proposed in recent years like, Perturbation and Observation (P&O). It works satisfactorily when the irradiance fluctuates very slowly. However, it often fails to track global MPP when irradiance changed suddenly. Another popular approach is the Incremental Conductance, it offers better tracking performance but oscillation around the MPP may still occur.

Most of the MPP control algorithms mentioned above operate very satisfactorily under uniform irradiance conditions, in which only a single MPP is to be detected. If multiple MPPs exist due to the partial shading, the usefulness of the conventional MPPT algorithms diminishes rapidly. Since the MPP controller is not able to recognize the correct MPP (i.e. it detects the local MPP instead of the global MPP), efficiency of the PV system reduced significantly. As a result, significant research has been carried out to reduce the effect of partial shading by improving the MPP capability of the controller.

In view of excellent performance of the multi-peak function optimization and global search of the evolutionary algorithm (EA), an EA technique known as particle swarm optimization

IoT based Smart Irrigation System using NodeMCU ESP8266

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Abstract:
Smart Irrigation System using Latest IoT technology is helpful and leads to ease of farming. The Smart irrigation System has wide scope to automate the complete irrigation system. IoT Based Smart Agriculture & Automatic Irrigation System with NodeMCU ESP8266. Agriculture plays a vital role in the development of agricultural countries. Some issues concerning agriculture have been always hindering the development of the country. Consequently, the only solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture. Hence the method is making agriculture smart using automation and IoT technologies. Internet of Things (IoT) enables various applications of crop growth monitoring and selection, automatic irrigation decision support, etc. We proposed ESP8266 IoT Automatic irrigation system to modernize and improve the productivity of the crop. Here we are building a IoT based Irrigation System using ESP8266 NodeMCU Module and Soil moisture Sensor. It will not only automatically irrigate the water based on the moisture level in the soil but also send the Data to Blynk Server to keep track of the land condition. The System will consist a water pump which will be used to sprinkle water on the land depending upon the land environmental condition such as Moisture.

Keywords: DC motor pump , Node MCU ESP8266 , LCD , PCB , 5V 1-Ch relay, Buzzer , Soil moisture sensor, I2C Module, Arduino IDE , Embedded C, Blynk App

(1) Introduction:

The Internet of Things (IoT) is the "network of interconnected sensor-equipped electronic devices that collect data, communicate with each other, and can be monitored or controlled remotely over the Internet[1]. Agriculture is considered as the basis of life for us as it is the main source of food and other raw materials. It plays vital role in the growth of country's economy. In general, most farmers use the manual method to water their crops, this system is inefficient. There are many benefits to the production of microcontroller-based circuits and the incorporation of advanced sensor technologies into agricultural applications. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods of farming. In India most of the irrigation system are manually operated one's. These outdated techniques are replaced with automated techniques. Currently, equipment for the saving of labor and water is a key problem in irrigation. The proposed system was initiated with the objective of automating irrigation processes and making the best use of technology for farmers[2]. If we water manually, there is a strong probability to overwater. Some crops will drown when we're giving them too much water. Automatic watering system is used to surmount this problem.

Power sharing in a Microgrid using PI and PI-SMC controllers for PVEWIG system

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Abstract:

The growing demand for reliable and high-quality power with a concern for environment has led to the concept of Micro-grid in which increase in load demand can be met through widespread power generation units called Distributed Generation (DG) units. The prospects for meeting this demand and avoiding crisis in supply would be improved with Renewable Energy Sources. A Microgrid can operate autonomously or interconnected with the public grid. In autonomous operating mode, the generating units should share the active and reactive power in the Microgrid, and they have to maintain the stability of the system. In this paper, standalone PV-wind hybrid generation is proposed to maintain reliability with continuous power supply by regulating the inverter DC link voltage using Boost Converter with Proportional Integral and Proportional Integral-Sliding Mode Controllers. The results have been validated using MATLAB/ Simulink.

Key words: Microgrid (MG), Power quality, Photo-Voltaic, Wind System

I. Introduction:

The major contributing sector of a country's economy is the power sector. The necessity of new, reliable and cleaner sustainable energy sources came into existence because of growing concern about the lack of energy resources and harmful impacts of fossil fuel emissions. Solar and wind energy system may be considered the most useful sustainable resources for electricity generation among several alternative sources, because of abundance and sustainability of wind speed and solar radiation [1]. The development in distribution generation technology such as wind turbine, photovoltaic system, and advancement in power electronics circuitry, increase in cost of fuel, energy demand and the depletion of fossil fuels are making the power sector to use these renewable energy sources as an alternative energy source for better stability, reliability and power quality [2].

An islanded microgrid must have its own resources to maintain the power quality, mainly the voltage and frequency rated values [3]. The voltage variations depend of the system reactive power, while the frequency depends of the system active power balance. Solar energy sources provide good quality of power but due to unavailability at night, these sources cannot be used at night. While on the other hand, the wind energy sources have opposite characteristics, i.e., it gives high power at night. Therefore, a hybrid energy system should be formed for confirming uninterruptable power and for controlling the power between this system and the utility grid, high power level converters are used. Nowadays many controllers are available to regulate the output of different converter but the main need of any controller is to provide a smooth and high quality of power [4]-[6].

In this paper, PV fed Inverter excited wind driven IG scheme (PVEWIG) is developed for regulation of the inverter DC link voltage using Boost Converter with PI and PI-SMC [10] controllers. The power quality parameters are improved at point of common coupling (PCC).

II. Proposed Model:

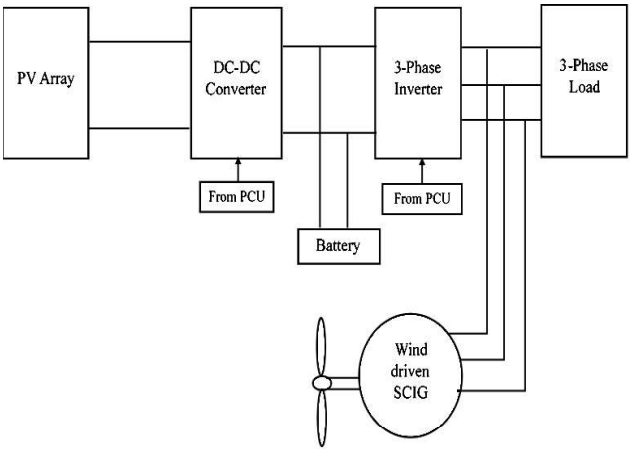

Figure.1 Block Diagram of Power Circuit for PVEWIG System with Battery

Fuzzy Controller Based Buck Boost and Cuk Converter fed BLDC motor drive

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Abstract- **An approach of speed control of the BLDC motor by controlling the dc link voltage of the voltage source inverter (VSI) is used with a single voltage sensor. This facilitates the operation of VSI at fundamental frequency switching by using the electronic commutation of the BLDC motor which offers reduced switching losses. A BL configuration of the buck–boost converter is proposed which offers the elimination of the diode bridge rectifier, thus reducing the conduction losses associated with it. A PFC BL buck–boost converter is designed to operate in discontinuous inductor current mode (DICM) to provide an inherent PFC at ac mains. The performance of the proposed drive is evaluated over a wide range of speed control and varying supply voltages (universal ac mains at 90–265 V) with improved power quality at ac mains. A bridgeless single phase ac-dc rectifier based Cuk derived converter topology fed BLDC motor is proposed to improve power factor at the AC mains near to the unity with low THD for PFC applications. It utilizes one control signal over the whole line cycle. In addition, the proposed converter exhibits low inrush current and low magnetic emissions as classical Cuk topology. The partial elimination of diodes in DBR in the bridgeless topology results in lower conduction losses as compared with conventional BUCK-BOOST converter. The proposed method is simulated in MATLAB/Simulink with PID and fuzzy logic controller for precise speed control. Simulation results are presented along with the theoretical analysis. The proposed concept is implemented by buck boost and cuk converter by using Mat lab/Simulink software.**

Key words **-Power Factor Correction (PFC), Bridgeless Cuk converters, Total Harmonic Distortions (THD), Power Quality, BLDC motor drive.**

I. INTRODUCTION

BLDC motors are most popular in household appliances over the last few decades. As the name indicates, it has no brushes for commutation thus eliminates the disadvantages of wear and tear in conventional DC motors. The switches are electronically commutated with the help of rotor position detected using hall sensors. Hence the BLDC motor is also known as electronically commutated motor [1-3]. Power quality problems have become important issues in these motors due to the recommended limits of harmonics in supply current by various international power quality standards such as the International Electro technical Commission (IEC). Combination of motor with inverter is the BLDC motor setup. BLDC motor is powered with two level inverter. The two level inverter composed of 6 switches. Based on rotor position obtained from hall sensors/optical encoders/resolvers, the power electronic switches are commutated [4].

A BLDC motor when fed by a diode bridge rectifier (DBR) has higher conduction losses. The high conduction loss caused by the high forward voltage drop of the bridge diode begins to degrade the overall system efficiency.Theheat generated within the bridge rectifier may destroy the individual diodes [5]. Hence, it becomes necessary to utilize abridge rectifier with higher current handling capability or heat dissipating characteristics. This increases the size and cost of the power supply, which is unacceptable for an efficient design. Bridgeless topologies seem to be the best solution for reducing the conduction and switching losses of the converter. Hence, power factor correction (PFC) converters are used for achieving a unity power factor at AC mains [6]. Such converters draw a sinusoidal supply current in phase with the supply voltage while maintaining the DC link voltage at the reference value over a wide range of load variation and supply voltage fluctuations [9].

Several bridgeless topologies are introduced. Bridgeless boost converter requires an additional converter or an isolation transformer to step down the voltage [10].Bridgeless buck converter is limited for step down applications. Bridgeless SEPIC converter has large number of semiconductor devices in the current conduction path during each switching cycle and has discontinuous output current resulting in a relatively high output ripple. Bridgeless buck-boost converter operates with high peak current in power components and poor transient response that makes it less efficient [11-13].

This paper presents a BL Cuk converter-fed BLDC motor drive with constant dc link voltage of VSI for improved power quality at ac mains with reduced components. The proposed method is simulated in

IoT Based Room Temperature Monitoring and Control System

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3.Chatakonda Santosh,Student, Dept. of EEE, G Pullaiah College of Engineering And Technology, Kurnool,A.P.,India

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Abstract:

The "Accurate room temperature controller using NodeMCU ESP8266"controls the temperature of any device according to its requirement for any industrial/home application. At the heart of the circuit is the NodeMCUcontroller which controls all its functions. The main purpose of this Digital Temperature Controller is to control the temperature of any device like AC or any other electronic devices whose temperature keeps fluctuating and thus requires a constant watch on the device. A temperature sensor LM35 is used for sensing the temperature of the environment and the system displays the temperature on an LCD in the range of –55°C to +150°C.This temperature is compared with the value stored by the user and if the temperature goes beyond the preset temperature then heater will switch off and if temperature goes below to preset value then heater will switch on. AC bulb is interfaced with the microcontroller which is done with the help of a relay and annpn transistor.The use of this system eliminates constant watching on the device by self controlling the temperature of the system.LCD display is used to display the temperature and when the temperature exceeds the set limit, the lamp is switched off in order to control the temperature.The heater is demonstrated with the help of a lamp. After the heater is switched off, the AC is switched ON. The display consists of LCD display to monitor real time temperature, AC on/off, Bulb On/off etc. By using blynk app, its button allows user to increment and decrement high and low temperatures. After that the system detects temperature and switches the load when it goes beyond set limits. Our proposed project consists of digital temperature sensors for more accurate temperature control in various industries.

Keywords: Node MCU ESP8266, LCD Display, DC Cooling Fan,LM35 Temperature Sensor, Embedded C, Arduino IDE

1.Introduction:

The goal of this project is to design an ambient temperature measurement and control circuit. The motivation for the project is the fact that temperature measurement has become an integral part of any control system operating in a temperature sensitive environment and the various learning outcomes associated during the implementation of the project.Temperature control is a procedure to maintain the temperature at a certain level. This method is commonly used in all regions of the world[1]. Recently in the globalization period, this method becomes an important part because there are several applications in daily life includes this procedure especially server room and greenhouse.Every day server room works nonstop in 24 hours. During this procedure, server room needs to be checked frequently in order to confirm its functionality and efficiency, particularly on temperature. Accurate room temperature controller mentioned as the best technique in any application by controlling the temperature automatically.

1.1.Project Working:

The principle reason for this Digital Temperature Controller is to control the temperature of any gadget like AC or whatever other electronic gadgets whose temperature continues fluctuating and thus these lines needs a consistent watch on the gadget. The utilization of this framework takes out consistent viewing on the gadget without anyone else controlling the temperature of the framework.The proposed project comprises of digital temperature sensors for more precise temperature control in several industries[2]. The LCD display is used to show the temperature and when the temperature exceeds the fixed limit, the lamp is turned off in order to regulate the temperature. The heater is established with the help of a lamp. After the heater is turned off, the AC is turned ON. Here alternating current is confirmed with the help of a small fan. After the AC is switched ON, it remains ON until the temperature ranges below the surpass limit. Thus the proposed

Life Cycle Testing of Electrical Loads by Down Counter using Arduino controller

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Abstract: A desired number is entered through a keypad interfaced to aArduino nano controller. The system is a down counter arrangement using a Arduino microcontroller of ATMEGA family that is used to test the life of electrical products. Upon activation, the system counts down one in each second till the set number reaches zero. A relay switches the load ON & OFF for every count thus testing the life cycle of a product.In industries having products like lights/bulbs/motor etc, it is important to test the lifecycle of the product.This life cycle is tested as the number of times it is switches ON/OFF and still works.Our project activates a relay switch that is used to switch the load On and OFF for desired number of times. Our system uses a microcontroller of the Arduino ATMEGA controller family having a keypad interfaced to it. It also has a 7 segment display to display the count.On running the system, the user can enter the number of times (0 – 999) he wishes to run the system cycle. Based on this, the system starts the cycle switching the load and a till the counter reached 0. The counter is a down counter that counts downwards from user entered number.On reaching zero the switching cycle is turned off.The system can be enhanced by adding a load output measuring system that lets user know when load collapses, so that system can directly provide the load life.

Keywords:4X3 Key pad; Life cycle; Down counter; Arduino nano; Relay Module

I.Introduction:

The working life of many products such as lamps depends on the number of ON/OFF cycles it encounters.It is very important to know approximate life cycle of any electrical loads. This project is designed to be used in industries for testing the life cycle of such electrical loads (lamps, motors etc) using a down counter[1].This circuit basically performs automatic ON/OFF operation. If it is supposed to see whether a light can withstand 100 times on/off encounter, the value is set to 100 through the keypad. Then the circuit automatically performs 100 times on/off operation. The count is shown in the LED. After operation the circuit is prepared for next operation. That is how an important task of industrial operation can be obtained by automation.This is a system design of for measuring the life cycle of electrical appliance. The working life of many products such as lamps depends on the number of ON/OFF cycles it encounters. This project is designed to be used in industries for testing the life cycle of such electrical loads (lamps, motors etc) using a down counter[2].This circuit basically performs automatic ON/OFF operation. If it is supposed to see whether a light can withstand 100 times on/off encounter, the value is set to 100 through the keypad. Then the circuit automatically performs 100 times on/off operation. The count is shown in the LED.

1.1.Block Diagram:

The basic blocks of this project are Arduino controller,Keypad, LCD, Relay Switch and Load.

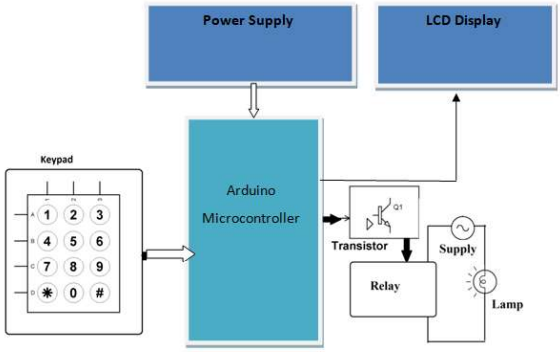

Fig. 1.Block diagram of Testing Life Cycle of Electrical Loads

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In this paper, PV fed Inverter excited wind driven IG scheme (PVEWIG) is developed for regulation of the inverter DC link voltage using Boost Converter with PI and PI-SMC [10] controllers. The power quality parameters are improved at point of common coupling (PCC).

II. Proposed Model:

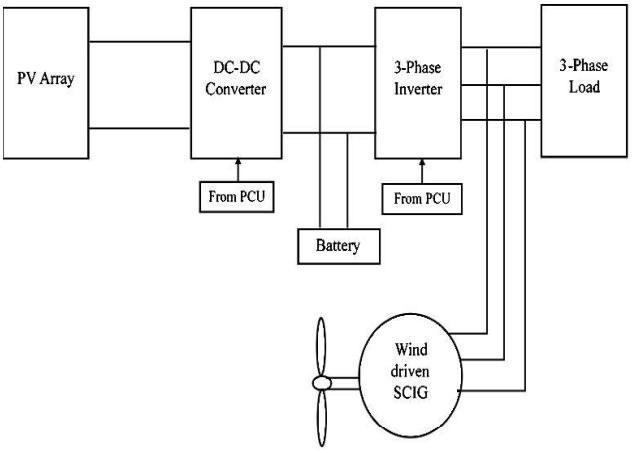

Figure.1 Block Diagram of Power Circuit for PVEWIG System with Battery

AUTOMATIC AND INSTANTANEOUS POWER QUALITY MONITORING SYSTEM USING IOT.

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ABSTRACT:
In these days Electrical energy is an important need the significance and utilization of power in increasing with each passing day. In order to raise the awareness about energy waste, an energy monitoring system is used that are designed by using Arduine hardware and software requirements.
IOT has become a part of modern world as it is a way cheaper than other equipment's.
An IOT platform allows to access the information required and also ensures safe operations. The energy monitoring system measure the electrical parameters like current, voltage and P.f. These values are read by Aurding which are displayed on the liquid crystal display (LCD).The main and foremost advantage of the system is that it is designed using low power consumption.
This approach is easy to design an efficient and real-time wireless network to monitor the power consumption of electrical appliances.
Thus the power quality submitting was developed around Arduino by using IOT platform from that it provides an energy sub metering Integrated circuits(IC).Whatever the data obtained from the sub meter by using IOT and it is transferred for the user purpose through wireless. These are also measured for the load, power quality analysis and energy management.
Keywords: Liquid Crystal Display (LCD), Integrated circuits(IC)

(1) INTRODUCTION:

Demand an electricity in increasing with each passing day. The generation, transmission and distribution of electrical energy gives the power system today electric power is viewed as a product with certain characteristics which can measured, predicted, guarantied and improved etc. Moreover it has become an integral part in our lives. Every consumer needs the power in such a way that the equipment runs in proper and safe conditions. Where power quality is essential for the equipment. Poor power quality may cause failures in the equipment. Therefore, power quality plays a major role to obtain reliable power.
In general the electrical energy is generated, transmitted, and distributed to the consumers. The demand of electricity on the distributing is more than transmission side. With the increasing technology the electrical energy can be monitored easily with the help of wireless system utilization of electrical energy has been improved in all industrial and commercial sectors. Also, the misuse of the electrical energy is serious problem. In order to avoid this the energy monitoring system is designed which detects the power consumption. This in an IOT based system which is cost effective and can be accessible from anywhere in the world.

This paper presents a case study of the wireless IOT based energy monitoring system which frequently monitors the electrical energy consumption by using Arduinos and Wi-Fi modules. The major advantages of this system is that it is cost effective and also detects faults easily.
Internet of things (IOT), enables us to connect the normal life i.e, in our day to day devices with each other over the internet. The devices connected IOT concept, can be analyzed remotely. Normally IOT concept provides the basic infrastructure and opportunities to form a connection between the physical world and the computer based system. So this concept has been gaining importance with more and more wireless devices that are increasing very rapidly in the present market. The ESP 8266 WI-IF module which is used in the system provides the connectivity with the internet in the system.

Hybrid Electric Vehicle System With DC/DC Converter Energy Storage

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ABSTRACT

This study develops a newly designed, patented, bi directional dc/dc converter (BDC) that interfaces a 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.

ISBN 978-93-90214-05-1

Enhancement of Power Quality by using Z-Source Based Dynamic Voltage Restorer

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ABSTRACT

Voltage sags and swells in the medium and low voltage distribution grid are considered to be the most frequent type of power quality problems based on recent power quality studies. Their impact on sensitive loads is severe. The impact ranges from load disruptions to substantial economic losses up to millions of dollars. Different solutions have been developed to protect sensitive loads against such disturbances but a series compensator is considered to be the most efficient and effective solution. Even the conventional concept suffers with effective controller problems. To tackle these situations, custom power apparatuses are utilized. Dynamic Voltage Restorer (DVR) is a modified power apparatus that is utilized to enhance voltage stability i.e. to minimize the power quality problems in electrical power system network. The important parts of the DVR comprise of voltage source inverter (VSI), booster transformers, filter and a dc energy source. The principle of the DVR is utilized to inject the voltage in series and in synchronism with the standard voltages with a goal to compensate voltage influences. There are various control techniques used for the operation of dynamic voltage restorer. This paper presents the hysteresis voltage control technique for generation of switching pulses for inverter of dynamic voltage restorer.

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Power Quality Improvement In Distribution System By Using Dual Voltage Source Inverter

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ABSTRACT

This paper presents a dual voltage source inverter (DVSI) scheme to enhance the power quality and reliability of the microgrid system. The proposed scheme is comprised of two inverters, which enables the microgrid to exchange power generated by the distributed energy resources (DERs) and also to compensate the local unbalanced and nonlinear load. The control algorithms are developed based on instantaneous symmetrical component theory (ISCT) to operate DVSI in grid sharing and grid injecting modes. The proposed scheme has increased reliability, lower bandwidth requirement of the main inverter, lower cost due to reduction in filter size, and better utilization of microgrid power while using reduced dc-link voltage rating for the main inverter. These features make the DVSI scheme a promising option for microgrid supplying sensitive loads. The topology and control algorithm are validated through extensive simulation and experimental results.

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An Improved Perturb and Observe based MPPT Algorithm for PV System

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Abstract:-Renewable energies have become the major priority in the recent times. They are the most available and exploitable forms of energy that are present in the nature. From the various renewable energy sources photovoltaic energy has transpired to be the most feasible source of electric power and is economically competitive with conventional sources. As the demand keeps on increasing on electricity and rising prices of conventional sources, photovoltaic energy is a promising alternative; it is freely available and less operational and requires low maintenance. Photo Voltaic (PV) systems are equipped with Maximum power point tracking techniques (MPPT) to maximize the PV array output power by tracking continuously. Out of the different techniques Perturb and Observe (P&O) technique is most widely used in commercial MPPT systems because it is less complicated and low cost to implement.

I. INTRODUCTION

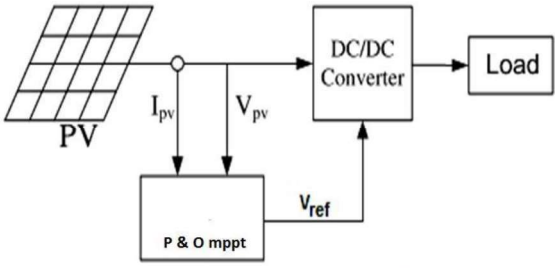
Energy is the foremost and most universal measure of all kinds of work by human beings and nature. In this world, every single thing that happens is the expression of flow of energy in one of its forms. Electrical energy is one of the most important forms of energy among all special types of energy that people require every day. Due to the increase of the energy demand and shortage of the non-renewable energy sources the demand for the renewable energy sources has increased. Out of all the renewable energy sources the photovoltaic systems (PV) are getting more significance due to their ease of installation, low maintenance. In isolated mode of power generation these are proven as the effective solution for feeding energy demand in rural areas. A photovoltaic system with Maximum power point tracking (MPPT) algorithm has been presented which increases the system efficiency.

A solar cell in the PV system exhibits the non-linear characteristics. The output power of the PV system mainly depends on irradiance and temperature. Hence the PV system due to these non linear characteristics produces less efficiency in the output power. To increase the efficiency of the PV system, maximum power point tracking techniques are introduced. Various MPPT techniques are used in the recent times to produce high tracking efficiency and good performance of the PV system. Most commonly used MPPT techniques used for PV system to track maximum power are open-circuit voltage technique, curve fitting technique, short-circuit current technique, Incremental conductance technique, perturbation and observation technique and other techniques. Perturbation and observation technique is most commonly used technique among all these techniques

In this paper PV modeling with MATLAB/SIMULINK maximum power point tracking is done by using P&O technique. The results are compared and the performance of the PV system is evaluated.

II. SYSTEM CONFIGURATION

The system consists of a PV module, DC/DC converter, P&O MPPT block and load. Let us see the



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In general PV cells shows nonlinear I-V and P-V. characteristics which differ with irradiation and temperature. The classic I-V and P-V characteristics of PV cell are shown in Fig.2

Power-Quality Improvement of a Novel Multilevel Based DSTATCOM

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Abstract- ***Multilevel inverters are a replacement family of converters for dc-ac conversion for the medium and high voltage and power applications. In this paper, a new topology for the staircase output voltage generation have been proposed with a lesser number of switch requirement. The topology required five dc voltage sources and eleven switches to urge 35 levels across the load, aside from having lesser switch count, exhibit the merits in terms of reduced voltage stresses across the switches. Another aspect of multilevel inverter (MLI) has been the choice of magnitude of dc voltages utilized in the topology. Supported this, MLIs are classified as symmetrical and asymmetrical. Symmetrical MLIs uses identical dc voltage sources whereas asymmetrical MLIs employs dc voltage sources having unequal magnitude. In this, asymmetrical configuration is used to urge higher number of levels generated at the output. In this, fundamental modulation techniques based nearest level control (NLC) is employed for the generation of gate pulse. Among fundamental switching frequency techniques, the NLC is generally used thanks to its easy control and implementation when performing on higher level inverter. Finally, simulation results of the proposed configuration have been verified by using MATLAB/Simulink.***

Keywords: Nearest level control, Multilevel Inverter, Inverter topology, Reduced Switch.

I Introduction

Multilevel inverters are preferable in most of the economic applications due to their superior power quality compared to standard two-level inverters. The voltage stress on the switches and more harmonic distortions are present in conventional two-level inverters. These problems can overcome once we choose multilevel inverters. That's why multilevel inverters have gained a popularity in most of the sensible applications. Most researches are happening to enhance the multilevel inverters and that we can get more power quality with less harmonic content. Inverter may be a device which converts DC (DC) into AC (AC). It's going to be a standalone equipment for applications like solar energy or to figure as a backup power supply from batteries. It provides an ac voltage from dc power sources and is employed for powering electronics and electrical equipment rated at the ac mains voltage. These are widely utilized in switched mode power supplies (SMPS).

Basically, a converter consists of power electronic switches like silicon-controlled rectifier (SCR), MOSFETs, and IGBTs etc., which are arranged during a symmetrical manner to convert AC to DC or the other way around. When a converter converts from AC to DC called as Rectifier and when it converts from DC to AC called as Inverter. If the AC load is only resistive, the particular output wave form shape produced at the output of an inverter isn't critical. Samples of purely resistive

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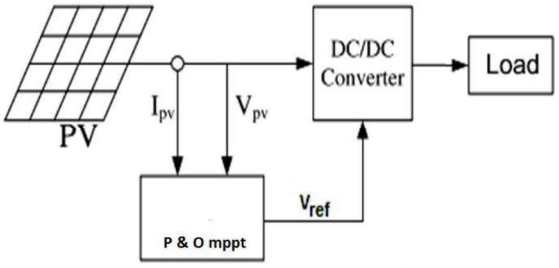

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AUGMENTED TORQUE CAPABILITY AT LOW SPEEDS IN INDUCTION MOTOR DRIVES BY SENSORLESS SCALAR CONTROL

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Abstract: In this paper, torque capacity is augmented at low speeds in an induction motor drive using a novel sensorless scalar control is proposed. This control scheme which is proposed addressed the problem of volt-per-hertz (V/f) control due to stator flux weakening the induction motor drive suffers from the torque capacity particularly at lower speeds. In this a dynamic voltage compensation scheme of an induction motor is developed for strengthening the stator flux which is simple, encoder free. The simulation results depicts the performance of augmented torque capability and speed regulation over open loop V/f and stator resistive voltage compensated V/f control at low speeds in induction motor drives by sensorless scalar control.

I. INTRODUCTION

The field oriented control (FOC) and direct torque control (DTC) are established for high performance speed induction motor drives, when transient performance is not a major concern scalar control is utilized in pumps, air conditioning, refrigeration and many other applications. During the past decades Current source inverters (CSI) played key role but later in adjustable speed drives (ASD) applications voltage source inverters (VSI) became most prevalent. The mostly used block diagrams of indirect FOC (IFOC) and DTC are shown in Fig.1 and Fig.2, respectively.

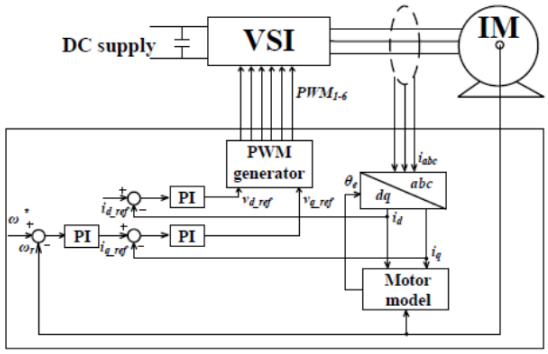

Fig.1.Control block diagram of IFOC

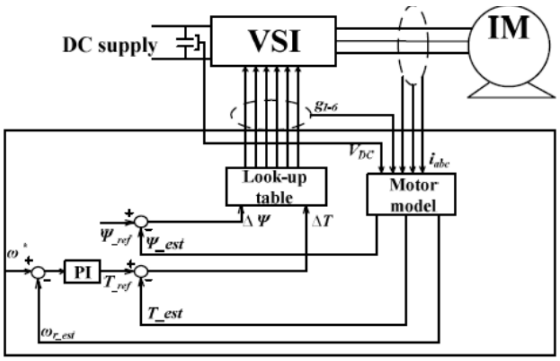

Fig.2.Control block diagram of DTC.

As seen from the block diagrams both are motor model dependent which requires multiple sensing feedback signals thereby increasing the complexity of implementation. To maintain the air gap flux at rated value constant volt-per-hertz (V/f) control in Fig.3 is independent of machine parameters by offering the simplest and least expensive solution to induction motor drives by varying the voltage in proportion to the supplied frequency to take care of the air-gap flux at rated value. However performance of constant V/f

Active Power Sharing and Power Quality (PQ) Improvement with VSC Controlled Solar Photovoltaic System

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Abstract: This paper presents a multifunctional voltage sourced-converter (VSC) controlled solar photovoltaic (SPV) system with a generalized dq and adaptive PLL-based approach to extract the dual features. This include improved active power sharing based on active power availability at the DC-side collector bus, as well as an active harmonic filter (AHF). When compared to its traditional counterpart, such as synchronous reference frame theory, the given control is computationally less intensive and easier to express (SRFT).The goal of the project to extract the many ancillary services provided by the multifunctional VSC in the power distribution system as efficiently as possible. Any grid connected inverter (GCI) serves the active power demand of load connected at point interconnection (PoI) in the power distribution network as the principal function. However, the fourth leg of the multifunctional VSC may be used as an AHF to attenuate the rich harmonic content present in source current, decrease the load reactive current need, and properly provide the zero sequences harmonic component required of the unbalanced and nonlinear load. In addition, the suggested system usually operates at unity power factor (UPF). During solar intermittency, an incremental conductance (IC) based control methodology is used to optimize and track the maximum power point (MPP). Transient test scenarios done in the MATLAB/Simulink software environment illustrate the utility of the proposed multifunctional VSC.

I.INTRODUCTION

In a recent year, the growing electricity demand across the globe and increasing carbon emission generated by non-renewable sources have been gaining special attention from the science and engineering society. At the meantime, electric utilities are also concerned about serving the raising needs of energy. Thus, it has now become mandatory to look towards renewable energy source (RES) as a promising substitute to produce green and clean power. Besides this, the development of new/an witching power electronics components, and the evolution in technological advance semiconductor technology have played a very crucial role in converting the energy generated by RES into a useful form. The classical converter technology employed in SPV typically systems suffers from poor efficiency ranging from 6 to 7% and was very expensive in earlier days. However, with continuous evaluation in technological research has brought the efficiency of SPV module from 6-8% to 15-16%. Moreover, the prices of SPV array module along with converter technology used in it diminishing very moderately.

The various operating modes have been considered and present all the for features of the multifunctional VSC based SPVPCS. The major contribution of this work is outline below:

1. The implementation of generalized “dq” reference based approach to overcome the drawback of conventional SRFT, which further enables the fast transient response.

A Novel Method of CHB Five Level STATCOM Based Multilevel Inverter

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Abstract- ***This paper presents a special gating pattern swapping technique for cascaded multilevel inverter, which is used for STATCOM. By using this technique besides minimizing the harmonic level, the inverter unit fundamental output voltages are, equalized. Therefore, all the inverter units in each phase leg can equally share the exchanged active and reactive power with the utility grid. This greatly helps the dc-link voltages balancing control. PI Control is employed for improving performance. The dc-link voltages of the inverters are regulated at different levels to obtain four-level operation. In this paper five level STATCOM based CHB multilevel inverter by using MATLAB/SIMULATION software. The simulation study is carried out in MATLAB/SIMULINK to predict the performance of the proposed scheme under balanced and unbalanced supply-voltage conditions.***

Index Term s —DC-link voltage balance, multilevel inverter, Power quality (PQ), static compensator (STATCOM).

I. INTRODUCTION

The rapid growth in electrical energy use, combined with demand for low cost energy, has gradually led to the development of generation sites remotely located from the load center. The generation of bulk power at remote locations necessitates the use of transmission line to connect generation sites to load centers. With long distance ac power transmission and load growth, active control of reactive power is indispensable to stabilize the power system and to maintain the supply voltage. The static synchronous compensator (STATCOM) using voltage source inverters has been accepted as a competitive alternative to the conventional Static VAr compensator (SVC) using thyristor-controlled reactors STATCOM functions as a synchronous voltage source. It can provide reactive power compensation without the dependence on the ac system voltage. By controlling the reactive power, a STATCOM can stabilize the power system, increase the maximum active power flow and regulate the line voltages. Faster response makes STATCOM suitable for continuous power flow control and power system stability improvement. The interaction between the AC system voltage and the inverter-composed voltage provides the control of the STATCOM var output [7] [8]. When these two voltages are synchronized and have the same amplitude, the active and reactive power outputs are zero.

In conventional cascaded multilevel inverter use fundamental switching frequency [2] to generate step waveform at low harmonic distortion and keep the switching loss as low as possible. But the inverter units' duty cycles are different from each other. Due to unequal duty cycle the inverter units cannot equally share the exchanged power with the utility grid [3]. In STATCOM to balance [5] the dc-link voltages, additional auxiliary inverters were used to exchange the energy among various capacitors. But the disadvantage is high cost and complexity in hardware design. In [2], to eliminate unequal duty cycles, the required dc capacitance of each inverter unit is calculated according to the corresponding duty cycle. But in practical application modular design is very difficult. By using proposed method inverter units' fundamental output voltage are equalized. Consequently, all the inverter units can equally share the exchanged power with the utility grid, and the dc-link voltage balancing control can be simplified. A special gating pattern is used for maintain the dc capacitor charge balance and equalize the current stress of the switching device.

In this paper, a static var compensation scheme is proposed for a cascaded two-level inverter-based multilevel inverter. The topology uses standard two-level inverters to achieve multilevel operation. The dc-link voltages of the inverters are regulated at asymmetrical levels to obtain four-level operation. To verify the efficacy of the proposed control strategy, the simulation study is carried out for balanced and unbalanced supply-voltage conditions.

II. CASCADED TWO-LEVEL INVERTER-BASED MULTILEVEL STATCOM.

Fig. 2 shows the circuit topology of the cascaded two-level inverter-based multilevel STATCOM using standard two-level inverters. The inverters are connected on the low-voltage (LV) side of the transformer and the high-voltage (HV) side is connected to the grid. The dc-link voltages of the inverters are maintained constant and modulation indices are controlled to achieve the required objective. The proposed control scheme is derived from the ac side of the equivalent circuit which is shown in Fig.3. In the figure, $v_a^{'}$, $v_b^{'}$ and $v_c^{'}$ are the source voltages referred to LV side of the transformer r_a, r_b, and r_c are the

Simulation of BLDC Motor by using Fuzzy Based Bridgeless Buck-Boost Converter

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Abstract - This paper shows another PFC bridgeless (BL) buck–boost converter for brushless direct current (BLDC) engine drive application in low -control applications. A Fuzzy logic execution in adaptable speed control of BLDC engine is done here. A methodology of rate control of the BLDC engine by controlling the dc bus voltage of the voltage source inverter (VSI) is utilized with a solitary voltage sensor. The controller is intended to track varieties of pace references and settles the yield velocity amid burden varieties. The BLDC has a few preferences contrast with the other kind of engines; however the nonlinearity of the BLDC engine drive attributes, in light of the fact that it is hard to handle by utilizing customary relative basic (PI) controller. So as to tackle this fundamental issue, the Fuzzy logic control turns into a suitable control. To give an inborn PFC at supply ac mains a converter based on buck-boost type is intended to work in broken inductor current mode (DICM). The execution of the proposed commute is mimicked in MATLAB/Simulink environment .

Keywords: Bridgeless (BL) Buck–Boost Converter, Brushless Direct Current (BLDC) Motor, Discontinuous Inductor Current Mode (DICM), Power Factor Corrected (PFC), Power Quality.

I. INTRODUCTION

The bidirectional dc-dc converter is also known as buck boost converter, which has more applications such as controlled battery charging. The dc-dc converters are being increasingly used to achieve power transfer between two dc power sources in either direction [1]. The dc-dc converter can be categorized in to buck, boost and buck boost types which are of low cost, compact in size, without transformer and easy to control due to common ground. There are number of variations of this basic Buck-Boost circuit, some designs work at lower frequencies or at high voltages which may use bipolar transistors instead of MOSFET [2]. In this paper a bidirectional dc/dc converter will be developed to control power flow between the battery and BLDC motor, hence the desired control variables are both output current and voltage. The proposed bidirectional buck-boost converters are applicable in energy storage based on battery applications. Brushless DC (BLDC) motors are becoming more popular in industrial and traction applications. This motor has less inertia, therefore it is easier to start and stop the motor. BLDC motors are potentially clean, fast, less noisy, more efficient and more [3]. The Brushless DC motor is driven by rectangular or trapezoidal voltage strokes which is coupled with the given rotor position. The voltages stroke must be properly aligned in the phases, so that the angle between the stator flux and the rotor flux is kept closer to 90° in order to get the maximum torque. The actual rotor position of BLDC motor can be detected without sensors but it often incorporates internal or external position sensors to sense the position. When the acceleration command is issued, the electric machine is operated in the motor mode. Output torque of the motor is controlled by a voltage source inverter (VSI) by adjusting the direction and amplitude of the phase current. If the input phase voltage is in phase with back EMF, motoring torque is developed and when the input current is out of phase with back EMF, braking torque is developed [4]. The regenerative braking refers to charge a battery using back EMF voltage of the motor. In this paper fuzzy logic controller is used for controlling the speed of brushless DC motor using bidirectional converter [5]-[6]. BLDC motor has a wide range of speed hence speed control is very important issue for it. The efficient speed control mechanism for the motor is done using meaningful fuzzy sets and rules.

This paper presents a BL buck–boost converter fed BLDC motor drive with variable dc link voltage of VSI for imp roved power quality at ac mains with reduced components and superior control

II. PRINCIPLE OF BLDC MOTOR

BLDC engine comprises of the perpetual magnet rotor and an injury stator. The brushless engines are controlled utilizing a three stage inverter. The engine obliges a rotor position sensor for beginning and for giving legitimate compensation arrangement to turn on the force gadgets in the inverter extension. In light of the rotor position, the force gadgets are commutated consecutively every 60 degrees. The electronic compensation takes out the issues connected with the brush and the commutator plan, in particular starting and destroying of the commutator brush course of action, along these lines, making a BLDC engine more rough contrasted with a dc engine. Fig.1 demonstrates the stator of the BLDC engine and fig.2 shows rotor magnet plans.

AUGMENTED TORQUE CAPABILITY AT LOW SPEEDS IN INDUCTION MOTOR DRIVES BY SENSORLESS SCALAR CONTROL

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Abstract: In this paper, torque capacity is augmented at low speeds in an induction motor drive using a novel sensorless scalar control is proposed. This control scheme which is proposed addressed the problem of volt-per-hertz (V/f) control due to stator flux weakening the induction motor drive suffers from the torque capacity particularly at lower speeds. In this a dynamic voltage compensation scheme of an induction motor is developed for strengthening the stator flux which is simple, encoder free. The simulation results depicts the performance of augmented torque capability and speed regulation over open loop V/f and stator resistive voltage compensated V/f control at low speeds in induction motor drives by sensorless scalar control.

I. INTRODUCTION

The field oriented control (FOC) and direct torque control (DTC) are established for high performance speed induction motor drives, when transient performance is not a major concern scalar control is utilized in pumps, air conditioning, refrigeration and many other applications. During the past decades Current source inverters (CSI) played key role but later in adjustable speed drives (ASD) applications voltage source inverters (VSI) became most prevalent. The mostly used block diagrams of indirect FOC (IFOC) and DTC are shown in Fig.1 and Fig.2, respectively.

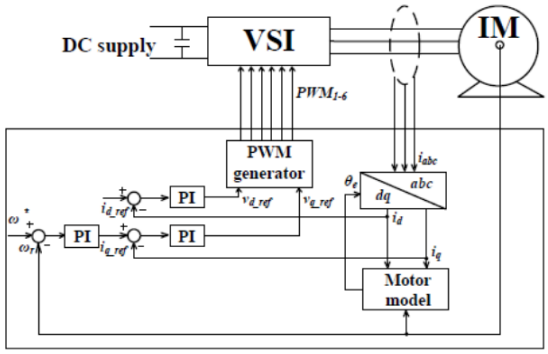

Fig.1.Control block diagram of IFOC

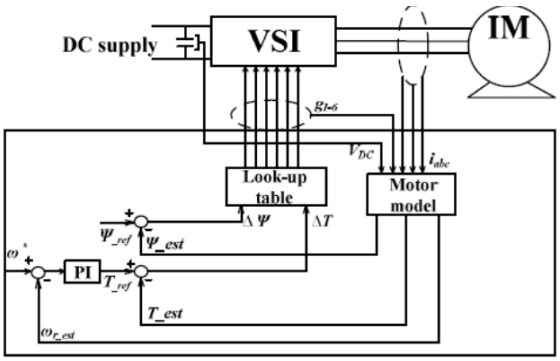

Fig.2.Control block diagram of DTC.

As seen from the block diagrams both are motor model dependent which requires multiple sensing feedback signals thereby increasing the complexity of implementation. To maintain the air gap flux at rated value constant volt-per-hertz (V/f) control in Fig.3 is independent of machine parameters by offering the simplest and least expensive solution to induction motor drives by varying the voltage in proportion to the supplied frequency to take care of the air-gap flux at rated value. However performance of constant V/f

Active Power Sharing and Power Quality (PQ) Improvement with VSC Controlled Solar Photovoltaic System

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Abstract: This paper presents a multifunctional voltage sourced-converter (VSC) controlled solar photovoltaic (SPV) system with a generalized dq and adaptive PLL-based approach to extract the dual features. This include improved active power sharing based on active power availability at the DC-side collector bus, as well as an active harmonic filter (AHF). When compared to its traditional counterpart, such as synchronous reference frame theory, the given control is computationally less intensive and easier to express (SRFT).The goal of the project to extract the many ancillary services provided by the multifunctional VSC in the power distribution system as efficiently as possible. Any grid connected inverter (GCI) serves the active power demand of load connected at point interconnection (PoI) in the power distribution network as the principal function. However, the fourth leg of the multifunctional VSC may be used as an AHF to attenuate the rich harmonic content present in source current, decrease the load reactive current need, and properly provide the zero sequences harmonic component required of the unbalanced and nonlinear load. In addition, the suggested system usually operates at unity power factor (UPF). During solar intermittency, an incremental conductance (IC) based control methodology is used to optimize and track the maximum power point (MPP). Transient test scenarios done in the MATLAB/Simulink software environment illustrate the utility of the proposed multifunctional VSC.

I.INTRODUCTION

In a recent year, the growing electricity demand across the globe and increasing carbon emission generated by non-renewable sources have been gaining special attention from the science and engineering society. At the meantime, electric utilities are also concerned about serving the raising needs of energy. Thus, it has now become mandatory to look towards renewable energy source (RES) as a promising substitute to produce green and clean power. Besides this, the development of new/an witching power electronics components, and the evolution in technological advance semiconductor technology have played a very crucial role in converting the energy generated by RES into a useful form. The classical converter technology employed in SPV typically systems suffers from poor efficiency ranging from 6 to 7% and was very expensive in earlier days. However, with continuous evaluation in technological research has brought the efficiency of SPV module from 6-8% to 15-16%. Moreover, the prices of SPV array module along with converter technology used in it diminishing very moderately.

The various operating modes have been considered and present all the for features of the multifunctional VSC based SPVPCS. The major contribution of this work is outline below:

1. The implementation of generalized “dq” reference based approach to overcome the drawback of conventional SRFT, which further enables the fast transient response.