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Cost Reduction in Clustering Based Unit Commitment Employing Hybrid Genetic-Simulated Annealing Technique

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Abstract

Fuel cost savings can be obtained by proper commitment of available generating units. This paper describes a new approach to the unit commitment problem through classification of units into various clusters based on hybrid technique of genetic algorithm and simulated annealing. This classification is carried out in order to reduce the overall operating cost and to satisfy the minimum up/down constraints easily. Unit commitment problem is an important optimizing task in daily operational planning of power systems which can be mathematically formulated as a large scale nonlinear mixed-integer minimization problem. A new methodology employing the concept of cluster algorithm called as additive and divisive hierarchical clustering has been employed based on hybrid

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Performance of PQ theory based Seven- level Cascaded Shunt Active Power Filter using PI, Fuzzy and ANFIS controllers for Harmonic Reduction

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Abstract



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- III. HARMONIC COMPENSATION WITH PQ THEORY CONTROLLED SEVEN LEVEL SHUNT ACTIVE POWER FILTER DRIVEN WITH LSCPWM
- IV. Results and discussions
- V. Conclusion

Abstract:This paper presents a PI and Fuzzy Logic controller based Cascaded Seven- level Shunt Active Power filter for harmonic suppression and reactive power compensation. This d... [View more](#)

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Abstract:

This paper presents a PI and Fuzzy Logic controller based Cascaded Seven- level Shunt Active Power filter for harmonic suppression and reactive power compensation. This device is controlled by means of PQ theory and the gate signals for SAPF are generated by LSCPWM. Later ANFIS controller is implemented for the control of proposed SAPF. Performance of proposed Seven level SAPF is studied for different loading conditions using PI, Fuzzy Logic and ANFIS controllers. The effectiveness of ANFIS controller is compared with other conventional controllers. Proposed work is simulated using MATLAB/ SIMULINK and results are tabulated.

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A New Method of Five Level Single-Stage Power Factor Correction of AC–DC Converter for Industry Applications

M Rama Prasad Reddy, Karanam Deepak, Y Hazarathaiyah

Abstract: In this article proposed a simulation of three-phase PFC AC-DC single stage 5 level converters uses capacitors in series. In the proposed 5 level converters utilize a flying capacitor arrangement through a normal phase shift Pulse Width Modulation toward develop efficiency, principally on light load circumstances. The implementation of the new method of three phase conventional method three level and proposed five level of the integrated AC – DC converter. The main advantages of the proposed rectifier are compared to conventional converter, with high input power factor and also it reduces harmonics of the input current. The possibility of the new 5 level converters is established with recreation results obtain from a proposed system converter. The proposed 5 level converter integrate the function of the improve PFC along with the five-level converter. During the proposed rectifier can be operated with low voltage stress along with control and the dc bus capacitors while it is five level converters is used in proposed converters. So the proposed method is more capable because of using very less diodes in the dc busses. The turn on losses is very less in proposed system. So in this paper proposed those 3 levels is implemented to five levels AC-DC converter for PFC correction.

Keywords: PFC (Power Factor Correction), 5 level converters, AC-DC converter for PFC correction, PWM Pulse Width Modulation, phase shift Pulse Width Modulation.

I. INTRODUCTION

In the Three phase converters like ac-dc contain be urbanized toward a developed level through the power quality improvement within provisions of power- factor correction (PFC), its reduces the THD (total Harmonic distortions) at the input side of the ac mains, and the output voltage is synchronized in dc output. By using buck converter, buck-boost converter, boost converter, multilevel converter and multi pulse modes of converter with operated in both unidirectional and bidirectional directions power flow. And

In the three phase converters of ac-dc renovation of electrical power is commonly used in ASDs [1], UPS AND high voltage direct current transmission, with the renewable applications like solar system, battery storage systems, in development knowledge such as electroplating system, welding unit systems, and battery charging of the EHV (Electric Vehicles) and also implemented in telecommunication systems [2][3]. In conventional method the ac-dc converters are recognized like rectifiers. These rectifiers are urbanized by via the diodes and also using semi conductor devices like thyristors to offer the both controlled and uncontrolled dc power. And these converters having main problem is power quality issues nothing but a voltage distortion problems, harmonic distortion problem, and poor power factor problems, complex size of using filters of both ac and dc filters [3][4]. so due this drawbacks in the present rectifiers are developed with new power electronic devices like IGBT'S, MOSFETS, and also used GTO'S. So in proposed technique we can develop the rectifier circuit by using the above power electronic devices. And the converters are classified as 1) Multi level converters 2) multi pulse converters 3) power factor type of converters 4) switched converters. Etc. So for the reason that of the firm condition of PQ is needed on the system effort side of ac mains, a number of principles contain the urbanized as well as compulsory happening the customers. Since the strictness of the power quality troubles a few additional options like passive filters of the system, and Active power Filters, as well as also used cross filters all along through the previous rectifiers have been widely urbanized, mainly for the large voltage rating and previously accessible installations[5][6]. But, the cost of the filters is high, complex in size and has sensible losses, which decrease the on the whole effectiveness of the entire scheme. During a few cases the converter evaluation of APF's is approximately secure toward the evaluation of the output ratings. Due to those conditions, it is consider the improved alternative to utilize such converters as a natural component of the proposed structure of the AC-DC conversion, and the features of the proposed converter is size is reduced, efficiency is high and also controlled the generated DC to supply contented and flexible type of procedure of the system. It is consider appropriate challenge toward there a extensive point of view happening the position of proposed ac-dc converters equipment in favor of the engineers by means of them as well as commerce through PQ problems. The present manuscript is proposed that a new five level single stage five level Ac-dc PFC converter.

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A Power Quality Improvement Method Adapted For Voltage Control Mode By Employing D-STATCOM

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Abstract -This paper presents a distribution static compensator (DSTATCOM) for power quality improvements in terms of controlling the voltage in a three-phase distribution system. The DSTATCOM is implemented with PWM current controlled six-leg voltage source converter (VSC) and the switching patterns are generated through a PI controller. The insulated gate bipolar transistor (IGBT) based VSC is supported by a capacitor and is controlled for the required compensation of the load current. The DSTATCOM is connected to the power system feeding variable loads. Voltage dip at load end is compared in between without DSTATCOM and with DSTATCOM by considering variable loads. The PI controller based DSTATCOM system is validated through extensive simulation in MATLAB with R-L loads with a case study. Key Words: DSTACOM, Control techniques, topologies, VSC, power quality.

1.INTRODUCTION

Recently a lot of research is being encouraged for power quality and custom power problems in the distribution system due to non-linear loads [1–4]. In practical applications most of the loads are non-linear, such as power converters, SMPS, arc furnaces, UPS and ASDs [5,6]. These non-linear loads are introducing harmonic distortion and reactive power problems [7]. The harmonics in the system induce several undesirable issues, such as increased heating losses in transformers,

low power factor, torque pulsation in motors, poor utilization of distribution plant and also affects other loads connected at the same Point of Common Coupling (PCC) [8,9]. The harmonic resonance is one of the most common problems reported in low and medium level distribution systems. It is due to capacitors which are used for power factor correction and source impedance [10]. There are mitigation techniques for power quality problems in the distribution system and the group of devices is known by the generic name of custom power devices (CPDs) [11]. Power converter based custom power devices (CPDs) are useful for reduction of power quality problems such as power factor correction, harmonics compensation, voltage sag/swell compensation, resonance due to distortion, and voltage flicker reduction within specified international standards.

2. DISTRIBUTION STATIC COMPENSATOR A DSTATCOM

is a custom power device which is utilized to eliminate harmonics from the source current and also balance them in addition to providing reactive power compensation to regulate the load bus voltage. The key component of the DSTATCOM is a power Voltage Source Converter (VSC) that is based on high power electronics technologies.

Comparative Analysis of Flying Capacitor and H-Bridge Multilevel Matrix Converters for DFIG Based Wind Energy Conversion System



G. Pandu Ranga Reddy, J. N. Chandra Sekhar, B. Naresh
and M. Vijaya Kumar

Abstract This paper discuss the comparative analysis of the Flying Capacitor Multi Level Matrix Converter and the H-Bridge Multi Level Matrix Converter topologies (replacing the conventional two stage converter and simple matrix converter) connected to a DFIG machine feeding the rotor from the grid to increase the efficiency of the machine. The THDs are compared with the interconnection of the DFIG machine to the grid with flying capacitor and H-Bridge multi level matrix converter. The complete analysis and graphical representations of the voltage and currents of the DFIG machine stator are shown with FFT analysis of current waveform in MATLAB Simulink software.

Keywords Double fed induction generator · Flying capacitor multilevel matrix converter · FFT-Fast Fourier transformation · H-bridge multilevel matrix converter · THD-Total harmonic distortion

1 Introduction

Over the past few years demand of electrical power is increasing day by day, leading to increase in power production using fossil fuels. To replace the fossil fuel energy generation, renewable sources are penetrated into the grid system. These renewable sources support the conventional sources with small capacities denoted as distribution generation [1]. In distribution generation the solar energy generation is vastly

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Energy Audit of G.Pullaiah College of Engineering and Technology

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Abstract: Today the energy consumption of every country is increased very sharply. In all sector energy is very much important for country economy. The energy demand is increasing very fast with the development of society. The prices and demand of energy is increasing with time so to control the price and demand a more effective and sustainable energy system becomes necessary. The aim of this paper is to make an energy survey of the building, evaluating different sources of energy supply and losses in the building.

Keywords: Energy Audit, Energy Efficiencies measures, Energy Management

1) INTRODUCTION

An energy audit is a process to study of a building or industry to know the energy consumption of the building and identify methods to reduce the energy consumption for energy savings. In Commercial Building, the present electrical consumption is about 8-10 percent of the total electricity. To meet the international level comfort and facilities the electrical demand is increasingly by 11-12 % annually. This is a challenge for every industry to ensure that energy growth in commercial building does not become unmanageable, but also gives and presents an opportunity to influence and identifies energy management issues in various commercial buildings and facilities.

As the natural resources are limited and energy uses are increasingly very sharply so it is very necessary to save natural resources by reducing energy consumption which can be achieved by using energy efficient equipment's and also by awareness of peoples about energy conservation [1].Energy audit in industrial and commercial, is the process to identifying opportunities to reduce carbon footprints and energy conservation.

(2) ENERGY AUDIT

An energy audit is a process for energy inspection, building survey and analysis of energy flow for energy conservation in a building or industry, or to reduce the amount of energy into the building without affecting the output of the building. Energy audit is a process of testing and analysis energy uses the industries and other organizations. National energy conservation laws stats that the regulations for energy consumption, investigation and energy audit management. In energy audit the survey of all electrical devices which use energy in a building after a period of time. Energy audit includes the supply of energy, use of energy and energy losses for all normal buildings.

Study And Applications Of Plc Dvp-14ss2 Kit

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Abstract This paper presents an interactive, less expensive and more portable Programmable Logic Controller (PLC) training platform for the industrial control of processes. The proposed system employs Delta DVP14SS2 PLC, WPLSoft software, a programming device, switches as inputs and pilot lamps as outputs. The training system gives one the flexibility to wire and program any type of inputs and outputs of one's choice and can be easily carried in one's laptop bag giving one the freedom to learn the PLC anywhere at one's own comfort. The paper is also meant to enlighten beginners and experienced PLC users to build themselves PLC trainers which can enhance their understanding of the theoretical knowledge gained from school. Traffic light automation application is set up to train the Electrical and Electronic Engineering students to measure the applicability of the system. Pre-test and post test are conducted for participating students as a way of measuring the understanding level of the student before and after training

I.INTRODUCTION

Increasing developments in the automation and manufacturing industries has caused much demand for Programmable Logic Controller (PLC) training for the execution of factory automation systems [1, 2]. Since the inception of PLCs for industrial automation and control, plant technicians, engineers and engineering students are challenged by lack of thorough

understanding of the PLC system. Moreover, due to the high cost associated with PLC training courses and the continuous changing demand of the automation industries, companies and institutions find it difficult to provide the needed training on the PLC [3].

A PLC is an industrial computer consisting mainly of hardware and software that is used to control a machine or a process [4-7]. It is designed for multiple input/output (I/O) arrangements, extended temperature ranges, immunity to electrical noise, and resistant to vibration and impact [6]. A PLC is an example of a real-time system since the output of the system controlled by the PLC depends on the input conditions. It has become the heart of industrial automation and control systems since 1968 [6, 8]. A PLC trainer is a designed prototype that allows beginners such as students and experienced PLC users to wire, program and simulate real-time control processes. The PLC trainer is a very useful tool for learning PLC hardware, software and programming on one's own

Research so far presented expensive, less portable, less interactive PLC trainers in the form of prebuilt hardwired kits and simulators [4, 9]; expensive and less portable PLC trainers are however not affordable to the masses of PLC users. Prebuilt hardwired kits in particular do not provide a more interactive system for the novice PLC user who needs it most. This is because they are pre-fabricated in a casing making it inaccessible to observe the interfacing between the controller and the I/O modules. These reasons contribute to the rising gap between the industry endowed graduates and the industries

Automation of Electrical Load Using DTMF Technique

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Abstract—Load forecasting is a very important factor for the electric industry in the deregulated economy. It is having many applications including energy purchasing and generation, load switching, contract evaluation, and infrastructure development. Many of mathematical methods have been developed for load forecasting. Load forecasting is the technique by using of which we can predict the electrical load. In case of deregulated market, The generating company have to know the market load demand for generating near to accurate power. If production will is not be sufficient to fulfill the demand, there would be the problem of irregular supply and if there is the case of excess generation the generating company will have to bear the loss. To overcome this problem there is a technique named as Neural network techniques, which have been recently suggested for short-term load forecasting by a large number of researchers. In this paper the applicability of this kind of models is discussed. This paper presents the basic idea behind load forecasting. There are many number of model suggested for the same, but the large variation and lack of comparisons make it difficult to directly apply proposed methods. It was concluded that a comparative study of different model types seems necessary. Several models were developed and tested on the real load data of a Finnish electric utility. In this paper we will discuss back propagation neural networks approaches to load forecasting. Index Terms—Neural Networks ,Back Propagation.

1. INTRODUCTION

The most used thing in today's world is energy. We are using energy in various forms in our day to day life i.e. electricity, refined oils, LPG, solar energy, wind energy, chemical energies in form of batteries and many other forms. Sometimes we are extravagant and sometimes we are careful. But the aim is to provide the uninterrupted supply to the users of electricity, and to achieve the aim there must be proper evaluation of present day and future demand of power. That's why we need a technique to tell us about the demand of consumers and the exact capability to generate the power and this need LOAD FORECASTING technique. It is used by power companies to estimate the amount of power needed to supply the demand. It tells about the scenario of present and future load demand. It has many applications including energy purchasing and generation, load switching, contract evaluation, and infrastructure development. Load forecasting has become in recent years one of the major areas of research in electrical engineering. Load forecasting is however a difficult task. First, because the load series is complex and of seasonality. Second, the load at a given hour is dependent not only on the load at the previous day, but also on the load at the same hour on the previous day and previous week, and because there are many important exogenous variables that must be considered. II. ARTIFICIAL

Car Control Using Lab View And IOT Module

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Abstract- : This paper proposes the concept of home automation and car parking in NILABVIEW. Smart home is a house that uses information technology to monitor the environment, control the electric appliances and communicates with the outer world. We use Ni Lab view software for smart home design with the facilities of internal lightening system, external lightening system, temperature, burglar alarm, water sprinkler, water level representation in water tank . After this it will be implemented in hardware to calculate the total energy. This will give the better analysis of the smart home system for usage and control. This paper also proposes a smart parking system to solve the problem of unnecessary time consumption in finding parking spot in commercial car park areas. The proposed car parking system takes the help of IR sensors to find the car at the entrance and at the exit area and thus allocates and de-allocates the available parking slots to the vehicles. This system clearly displays the total parking slots available and indicates the occupied slots and unoccupied slots in display board so that user can check the slots before entering the parking area and can park his car in that slot with in no time.

Keywords: Lab View, Infrared sensor, Automation, Sun Lightening, Alarm.

I. INTRODUCTION

The process of controlling or operating various equipment, machinery, industrial processes, and other applications using various control systems and also with less or no human intervention is termed as automation. There are various types of automation based on the

application they can be categorized as home automation, industrial automation, autonomous automation, building automation, etc. In this paper, we discuss about wireless home automation using IOT .Home automation is the process of controlling home appliances automatically using various control system techniques. The electrical and electronic appliances in the home such as fan, lights, outdoor lights, fire alarm, car parking etc., can be controlled using various control techniques[1]. In order to reduce the damage caused by illegal parking and parking space shortage problems, we try to develop a smart parking system that manages the conditions[2] . Various systems have been done to ensure smoothness of traffic in car park areas. From manual implementations used in the old systems, they have evolved into fully automated, computerized systems[3][4]. There are various techniques to control home appliances such as IOT based home automation over the cloud, home automation under Wi-Fi through android apps from any smartphone, Arduino based home automation, home automation by android application based remote control, home automation using digital control, RF based home automation system and touch screen based home automation. Wireless home automation using NI LabVIEW is developed to control home appliances remotely over the cloud[5].

II. RELATED WORK

The work mainly focuses on the improving the smart home automation system has been developed to automatically achieve some activities performed frequently in daily life to obtain more comfortable and easier life

THD Reduction in Multi-Level Inverters based On Multicarrier Pulse Width Modulation Technique

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Abstract Due to the advent of technology, electronic equipments are much more sensitive to harmonic and its analysis play an important role whereby reducing the distortion due to harmonics needs attention. To meet the requirements of the industries, harmonic free-high rating power sources are in high demand. Total Harmonic Distortion (THD) is an indicator of AC voltage source quality. In case of inverters, one such way to reduce THD would be the use of Pulse Width Modulation (PWM). The existing methods mainly use the low frequency pulse width modulation techniques for the switching. Control methods employing high frequency switching techniques held in controlling THD with proper application of filters. This paper analyses THD in multilevel inverters using multicarrier PWM technique with five pulse width modulation technique through MATLAB simulations. Finally, a comparison is done to find the less harmonic generated PWM method using fewer filters.

Keywords: Harmonics, Multilevel Inverter, SPWM, Total Harmonic Distortion

(I) INTRODUCTION

Practical industrial inverters are of non-sinusoidal in nature and are prone to harmonics. In case of low- power applications,

voltage of quasi squared or pulse waveform is desired but high and moderate power applications warrant sinusoidal output waveforms with minimum distortion. Use of filters and certain techniques like PWM minimize the harmonics in the inverter's output. The former poses some demerits like size, cost etc. while the later helps in reducing the usage of filters.

i. Total Harmonic Distortion

The total harmonic distortion is a common measure of signal harmonic level causing distortion at voltage or current level. It is referred as the ratio of total harmonics to that value at the fundamental frequency. It is usually given in percentage. There has been phenomenal increase of non-linear loads in the industries which may cause harmonics in the output. The non-linear loads imply loads which the applied voltage and current are not proportional to each other. These non-linear loads possess varying V-I characteristics. A marginal raise in voltage at times may result in doubling of current.

ii. Multilevel Inverters

There is huge ever raising demand of electrical energy worldwide. This has led to the depletion of energy sources that are conventional in nature. Hence alternate

Advanced Five Level Multilevel Inverter With Reduced Switching Elements For Electric Vehicle

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Abstract: A multilevel inverter is a power conversion device that produces an output voltage in the desired levels by using DC voltage sources at the input. The number of DC voltages and switches increases with number of output voltage levels for the conventional topologies. This is the main drawback of the conventional topologies. Here a new multilevel inverter is presented, which uses switched capacitor units. The switched capacitor multi-level inverter can produce the desired output voltage and also can boost the input voltage without any bulky transformer. Also, the number of switches and DC voltage sources are reduced in this topology. This reduces the size and cost of the inverter. This topology uses series and parallel combination of the basic unit to produce higher level output voltage. In this paper the operation and simulation results of a hybrid five-level inverter is presented using MATLAB/Simulink software. Multilevel inverters have their many applications in renewable energy systems. This new multilevel inverter using switched capacitor units can also be used for renewable energy applications.

Keywords: Cascaded H-Bridge, Hybrid Multilevel inverters, Series and Parallel Switches, Staircase Modulation

I.INTRODUCTION

The Switched Capacitor Multilevel Inverter can produce the desired sinusoidal voltage waveform and boost the input voltage without any bulky transformer. Because of the inherent voltage unbalancing of capacitors in the switched capacitor multilevel inverters, using complicated capacitor voltage balancing is necessary. Capacitor voltage balancing techniques will be more complex when higher number of voltage levels is produced at the output. In order to mitigate this problem, the hybrid-source switched capacitor topologies can be used. By using this kind of inverter with fewer switching devices and simpler control methods, it is possible to achieve a greater number of voltage levels at the output. The hybrid source switched capacitor topologies can be used in electric vehicle application and PV systems.

The hybrid multilevel inverter using switched capacitor units consist of a combination of the conventional series and parallel switched capacitor units. The hybrid multilevel inverter topology using switched capacitor units reduces number of switches and isolated DC voltage sources, the variety of the DC voltage source values, and the size and cost of the system in comparison with the conventional topologies. In addition, this topology can boost the input voltage without a transformer.

Automatic Street Light Control System

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Abstract - The system elaborates the design and construction of automatic light control system. The developed electronic system eliminates the disadvantages of the existing systems. Based on the results the microcontroller calculates and automatically detects geographical area and retrieve relevant data for sunrise and sunset in the area, respectively ensures very precise ON/OFF mode of the lighting system. The circuit uses a light sensor to sense the light. It doesn't need operator maintenance and initial installation setup. The developed electronic device increases bulb life in result of the dimming effect. On the other hand this decrease of the illumination leads to reduce in the energy consumption. Light sensors and micro controller, relay are the main components of the project. Light sensor is like our eye which detect the presence of an object and Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically.

Keywords: Microcontroller; Light Dependent Resistors (LDR); Relay.

I.INTRODUCTION

The Street lights are the major requirements in today's life for safety purposes and avoiding accidents during night. Providing street lighting is one of the most important and expensive responsibilities of a city. Lighting can account for 10-38% of the total energy bill in typical cities worldwide. Street lighting is a particularly critical concern for public authorities in developing countries because of its strategic importance for Now, we need arise to make the system automated so that human intervention and manual work avoided

and create the transparency in system. In our project we propose the concept about to economic and social stability. The fixtures of street lights indirectly have assisted the public and government in reduction of crime rate and accidents in the area. It also encourages social inclusion by providing an environment in which people feel they can walk in hours of darkness. Despite that in today's busy lifestyle no one bothers to switch it OFF/ON when not required. Inefficient lighting wastes significant financial resources each year, and poor lighting creates unsafe conditions. Energy efficient technologies and design can cut street lighting costs dramatically. The main consideration in the present field technologies are Automation, Power consumption and cost effectiveness [1],[2]. Automation is intended to reduce man power with the help of intelligent systems. Power saving is the main consideration forever as the sources of the power are getting diminished due to various reasons. Designing a cost efficient system is very important as the requirement is more. In order to overcome this problem, automatic street light control methods is introduced. The main objective of our project is to provide a better solution to minimize the electrical wastage in operating street lights, in this era of automation humans are restless and are not in a position to regulate the manual operations in any field, a rapid advancement in embedded systems has paved path for the design and development of microcontroller based automatic control systems. Our project presents an automatic street light controller using light dependent resistor (LDR). By using this system manual works are removed. The street lights are automatically switched ON

Advanced Home Automation Using Lab View Software and Arduino Interface

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Abstract -- The present era is of automation and smart surveillance systems. Power engineers are more focused on automation of conveyor belts for quality products. Process and manufacturing industries face many problems due to inefficient operation of equipment. Many industries go for manual operation of conveyor belts which results in to hazardous operations. Solution to this is automatic and effective monitoring and operation of conveyor belt, which is proposed in the said work. This Paper represents the speed control of conveyor belt with temperature changes using VFD (Variable Frequency Drive) system operated by PLC-HMI system. The presented work is developed to control the speed of Conveyor belt in kiln with Temperature changes. The system is composed of PLC and touch screen. The hardware and software of the system station is designed by DVP-14SS2 PLC, including the module setting of PLC and its interface wires. After introducing the system design, simulation is made in the software WPLSoft. The simulation results made in the software KincoHMIware. An attempt has been made to show efficient control of conveyor belt for reliable operation of industrial processes

I. INTRODUCTION

Automation may be defined as “The technique, method, or system of controlling a process by highly automatic means, as by electronic devices, reducing human intervention to a minimum.” The term automation refers to devices such as automated machinery or other intelligent

devices that are used to control and execute some required task. The devices used for automation ranges from small sensors like Proximity sensors, thermocouples to large robots and highly efficient computers. “The control of industrial machines and process with the help of computer by replacing human operators is known as Industrial Automation.” Automation is used in almost every field on earth. It is used in industry; homes; offices; schools; military applications and in transportation system. The devices employed for automation include different kind of sensors, programmable logic controllers, actuating systems, intelligent control systems, modern control algorithms, robotics, electronic systems and many other devices. There is a list of tools used for the industrial automation. These tools ranges from HMI by mean on which operator controls the process, to SACDA, used for data acquisition. Different types of industrial automation tools are listed below: 1. Simulator 2. Distributed Control System (DCS) 3. Programmable Logic Controller (PLC) 4. Human Machine Interface (HMI) 5. Supervisory Control and Data Acquisition (SCADA) 6. Batch Management System (BMS) 7. Manufacturing Execution System (MES) 8. Laboratory Information Management System (LIMS)

In this paper, an improved SVPWM based shunt APF topology is proposed. The harmonic currents are extracted by synchronous reference frame (SRF) theory and the switching instants for each inverter arm are computed directly using the effective time

Simulation of Fuzzy logic controller based MLI-STATCOM with Synchronous Reference Frame in Power Distribution Network

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Abstract: In this Project Fuzzy based MLI-STATCOM with Synchronous reference frame in Distribution network is presented. In Modern distribution systems have very complex networks connected with linear and nonlinear loads. The presence of harmonics in system it will effected with power quality problems. Due to this high amount of power losses and disoperation of power electronics devices is caused, along with this Harmonics have a number of undesirable effects like Voltage disturbances. These harmonics are needed to mitigate for Power Quality Enhancement in distributed system. To suppress harmonics and other power quality issues related to current, Distribution Static Compensator (DSTATCOM) connected across load is proved to be effective. DSTATCOM is one of the FACTS Devices which can be used to mitigate the harmonics. This paper proposes a five-level diode clamped Multilevel Inverter based Distribution STATCOM (MLI-DSTATCOM) with Synchronous Reference Frame based control for harmonic mitigation. The voltage source converter is core of the DSTATCOM and the hysteresis current control is indirect method of controlling of VSC. In this paper we implement with SRF based DSTATCOM control. SRF theory is implemented for the generation of controlling reference current signals for controller of DSTATCOM. A fuzzy logic control scheme is proposed for the controlling operation of STATCOM. The system performance will analyzed .In extension by implementing fuzzy logic control to the system the harmonics are mitigated in the distribution system and Total harmonic distortion will be reduced.

Keywords—Multilevel Inverter based Distributed STATCOM (MLI-DSTATCOM); Synchronous Reference Frame (SRF); Power Quality (PQ); Harmonic Mitigation; Active Power Filter (APF); Total Harmonic Distortion (THD).

1. INTRODUCTION

Rising apprehension for rising cost of energy, environmental impacts due to the use of fossil fuels, fast diminution of fossil fuels reserves and it is indispensable to reduce green house gas emissions encouraged the development of the renewable energy. Of all the

renewable energy sources, wind power has undergone colossal development in recent years because wind power is pollution free and cost effective [1-2]. Performance of any CPDs is greatly reckoning on the gating pulses and also the management rule to get calculable reference currents. Few management algorithms principally utilized area unit feed forward coaching [6], SRF theory and instant active and reactive power theory [9] –[12], Lyapunov-function management [13] and also the non-linear management technique [14] etc. Performance of MLI-DSTATCOM is analyzed during this paper with nonlinear, balanced/unbalanced load. With the planned management methodology, load currents, supply currents and supply voltages area unit measured. Total Harmonic Distortion (THD) of offer currents with standard two-level DSTATCOM, threelevel diode clamped and five-level diode clamped MLIDSTATCOM is developed and analyzed in Matlab/Simulink code. This study has been swollen to active and reactive power flow analysis. This paper is organized as following: Section II explains DSTATCOM operation. Section III explains SRF management for DSTATCOM. Section IV discusses observations made up of results. Section V concludes work.

The fast growth and reputation of power electronics technology lead to wide use of industry loads which posses' power quality (PQ) issues [1]. The power quality is primarily exaggerated due to current harmonics introduced by the nonlinear loads into the distribution network. The PQ issues featured with harmonic distortion, low power factor and phase disproportion produce astonishing turbulence in the function of electrical equipment [2]. Conventionally, static capacitors and passive filters have been employed to enhance PQ in distribution system. Nevertheless, these frequently have issues like fixed compensation, system parameters dependent performance and probable resonance with line reactance [3]. Owing to this the capability to even out the transmission systems and to enhance PQ in distribution systems is showed [6]. Distribution Static synchronous compensator (DSTATCOM) is prevalently acknowledged as a consistent reactive power controller substituting

Minimizing Penalty by Engaging APFC (Automatic Power Factor Compensation) Unit for Industries

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Abstract In the industrial sector the various motoring loads are continuously running and increasing the inductive load. So the power factor in this system get reduces due to the inductive reactive power. But the electricity board has a standard limit regarding the power factor values and if the power factor goes below the specified limit the electricity company charges the penalty to the industrial consumers. APFC device reads power factor from line voltage and line current by determining the delay in the arrival of the current signal with respect to voltage signal from the function generator with high accuracy by using an internal timer. This time values are the calibrated as phase angle and corresponding power factor. Then the values are displayed in Liquid crystal display modules. Then the motherboard calculates the compensation requirement and accordingly switches on different capacitor banks. This is developed by using AVR microcontroller.

KEYWORDS: Power factor, Penalty, AVR microcontroller, capacitor bank, contactors and current transformer, potential transformer.

I. INTRODUCTION

In the present innovative upset power is valuable. So we have to discover the reasons for control misfortune and enhance the influence framework. Because of industrialization the utilization of inductive load increments and thus control framework misfortunes its productivity. So we have to

enhance the power factor with an appropriate strategy. At whatever point we are considering any programmable gadgets then the inserted innovation comes into fore front. The installed is presently a day especially mainstream and most the item are produced with Microcontroller implanted technology. Automatic control factor remedy gadget peruses control factor from line voltage and line current by deciding the deferral in the landing of the present flag as for voltage motion from the capacity generator with high precision by utilizing an inward clock. This time esteems are then adjusted as stage point and relating power factor. At that point the qualities are shown in the 2X16 LCD modules. At that point the motherboard ascertains the remuneration prerequisite and appropriately switches on various capacitor banks. This is produced by utilizing 8051 microcontroller. Automatic power factor correction techniques can be applied to the industries, power systems and also house holds to make them stable and due to that the system becomes stable and efficiency of the system as well as the apparatus increases. The use of microcontroller reduces the costs

The low power factor leads to the increase in the load current, increase in power loss, and decrease in efficiency of the overall system. In previous various method use for power factor correction in all this method, the switching of the capacitor is manual. In this paper we are using a method of the reactive power compensation by capacitor switching with automatic control using AVR microcontroller

Integrated Photo Voltaic and Dynamic Voltage Restorer System Configuration

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Abstract- This paper presents a new system configuration for integrating a grid-connected photovoltaic (PV) system together with a self-supported dynamic voltage restorer (DVR). The proposed system termed as a —six-port converter, consists of nine semiconductor switches in total. The proposed configuration retains all the essential features of normal PV and DVR systems while reducing the overall switch count from twelve to nine. In addition, the dual functionality feature significantly enhances the system robustness against severe symmetrical/asymmetrical grid faults and voltage dips. A detailed study on all the possible operational modes of six-port converter is presented. An appropriate control algorithm is developed and the validity of the proposed configuration is verified through extensive simulation as well as experimental studies under different operating conditions.

Keywords: Bidirectional Power Flow, Distributed Power Generation, Photovoltaic(PV) Systems, Power Quality, Voltage Control.

I.INTRODUCTION

The fast depletion of conventional energy resources and increasing environmental concerns have made renewable energy resources, such as photovoltaic (PV) and wind, progressive sources of electric power generation [1]–[4]. Since power generated by a PV source is principally dc, it requires a dc–ac inversion stage for grid-connected operation. The main component of a grid-

connected PV system is generally the three phase voltage source inverter (VSI) having six switches in total. Its primary function is to enhance the injected active power through maximum power point tracking (MPPT) control of PV array [5]. On the other hand, with the increased penetration of sensitive loads, the power quality issues in the modern distribution system have significantly increased [6]. Most frequent and serious disturbances in the grid voltage are sags, swells, and faults. To maintain uninterrupted voltage at load terminals, various custom power devices are used among which DVR is considered as the most effective and comprehensive solution[7]–[11]. It is likely that the modern load centers would be equipped with on-site PV generation unit(s) as well as custom power device(s) for critical load protection.

Fig1 shows such a system configuration where a grid-connected PV plant injects active power through six-switch VSI (PV-VSI) while self-supported DVR performs voltage sag compensation for sensitive loads using second six-switch VSI (DVR-VSI). During the occurrence of fault/deep sag at the point of common coupling (PCC), these independent PV and DVR systems face major operational limitations. In this scenario, the self-supported DVR can no longer maintain the rated load voltage due to finite energy in dclink

A New Method of Five Level Single-Stage Power Factor Correction of AC–DC Converter for Industry Applications

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Abstract: In this article proposed a simulation of three-phase PFC AC-DC single stage 5 level converters uses capacitors in series. In the proposed 5 level converters utilize a flying capacitor arrangement through a normal phase shift Pulse Width Modulation toward develop efficiency, principally on light load circumstances. The implementation of the new method of three phase conventional method three level and proposed five level of the integrated AC – DC converter. The main advantages of the proposed rectifier are compared to conventional converter, with high input power factor and also it reduces harmonics of the input current. The possibility of the new 5 level converters is established with recreation results obtain from a proposed system converter. The proposed 5 level converter integrate the function of the improve PFC along with the five-level converter. During the proposed rectifier can be operated with low voltage stress along with control and the dc bus capacitors while it is five level converters is used in proposed converters. So the proposed method is more capable because of using very less diodes in the dc busses. The turn on losses is very less in proposed system. So in this paper proposed those 3 levels is implemented to five levels AC-DC converter for PFC correction.

Keywords: PFC (Power Factor Correction), 5 level converters, AC-DC converter for PFC correction, PWM Pulse Width Modulation, phase shift Pulse Width Modulation.

I. INTRODUCTION

In the Three phase converters like ac-dc contain be urbanized toward a developed level through the power quality improvement within provisions of power- factor correction (PFC), its reduces the THD (total Harmonic distortions) at the input side of the ac mains, and the output voltage is synchronized in dc output. By using buck converter, buck-boost converter, boost converter, multilevel converter and multi pulse modes of converter with operated in both unidirectional and bidirectional directions power flow. And

In the three phase converters of ac-dc renovation of electrical power is commonly used in ASDs [1], UPS AND high voltage direct current transmission, with the renewable applications like solar system, battery storage systems, in development knowledge such as electroplating system, welding unit systems, and battery charging of the EHV (Electric Vehicles) and also implemented in telecommunication systems [2][3]. In conventional method the ac-dc converters are recognized like rectifiers. These rectifiers are urbanized by via the diodes and also using semi conductor devices like thyristors to offer the both controlled and uncontrolled dc power. And these converters having main problem is power quality issues nothing but a voltage distortion problems, harmonic distortion problem, and poor power factor problems, complex size of using filters of both ac and dc filters [3][4]. so due this drawbacks in the present rectifiers are developed with new power electronic devices like IGBT'S, MOSFETS, and also used GTO'S. So in proposed technique we can develop the rectifier circuit by using the above power electronic devices. And the converters are classified as 1) Multi level converters 2) multi pulse converters 3) power factor type of converters 4) switched converters. Etc. So for the reason that of the firm condition of PQ is needed on the system effort side of ac mains, a number of principles contain the urbanized as well as compulsory happening the customers. Since the strictness of the power quality troubles a few additional options like passive filters of the system, and Active power Filters, as well as also used cross filters all along through the previous rectifiers have been widely urbanized, mainly for the large voltage rating and previously accessible installations[5][6]. But, the cost of the filters is high, complex in size and has sensible losses, which decrease the on the whole effectiveness of the entire scheme. During a few cases the converter evaluation of APF's is approximately secure toward the evaluation of the output ratings. Due to those conditions, it is consider the improved alternative to utilize such converters as a natural component of the proposed structure of the AC-DC conversion, and the features of the proposed converter is size is reduced, efficiency is high and also controlled the generated DC to supply contented and flexible type of procedure of the system. It is consider appropriate challenge toward there a extensive point of view happening the position of proposed ac-dc converters equipment in favor of the engineers by means of them as well as commerce through PQ problems. The present manuscript is proposed that a new five level single stage five level Ac-dc PFC converter.

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Simulation of closed loop control of Solar PV Array-Fed Water Pumping System Using Zeta Converter of BLDC Motor Drive

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Abstract: This paper proposes a solar photovoltaic (SPV) array fed water pumping system utilizing a zeta converter as an intermediate DC-DC converter in order to extract the maximum available power from the SPV array. Controlling the zeta converter in an intelligent manner through the incremental conductance maximum power point tracking (INC-MPPT) algorithm offers the soft starting of the brushless DC (BLDC) motor employed to drive a centrifugal water pump coupled to its shaft. Soft starting i.e. the reduced current starting inhibits the harmful effect of the high starting current on the windings of the BLDC motor. A fundamental frequency switching of the voltage source inverter (VSI) is accomplished by the electronic commutation of the BLDC motor, thereby avoiding the VSI losses occurred owing to the high frequency switching. A new design approach for the low valued DC link capacitor of VSI is proposed. The proposed water pumping system is designed and modeled such that the performance is not affected even under the dynamic conditions. Suitability of the proposed system under dynamic conditions is demonstrated by the simulation results using MATLAB/Simulink software.

Key words: Brushless dc (BLDC) motor, incremental conductance maximum power point tracking (INC-MPPT), solar photovoltaic (SPV) array, voltage-source inverter (VSI), waterpump, zeta converter

I. Introduction

Severe environmental protection regulations, shortage of fossil fuels and eternal energy from the sun have motivated these researchers towards the solar photovoltaic (SPV) array generated electrical power for various applications [1]. Water pumping is receiving wide attention nowadays amongst all the applications of SPV array. To enhance the efficiency of SPV array and hence the whole system regardless of the operating conditions, it becomes essential to operate SPV array at its maximum power point by means of a maximum power point tracking (MPPT) algorithm [2-4]. Various DC-DC converters have been already employed to accomplish this action of MPPT. Nevertheless, a Zeta converter [5-9] based MPPT is still unexplored in any kind of SPV array based applications. An incremental conductance (INC) MPPT algorithm [2] is used in this work in order to generate an optimum value of duty cycle for the IGBT

(Insulated Gate Bipolar Transistor) switch of Zeta converter such that the SPV array is constrained to operate at its MPP. Various configurations of Zeta converters such as self-lift circuit, re-lift circuit, triple-lift circuit and quadruple-lift circuit using voltage lift (VL) technique have been reported in aforementioned topologies have high voltage transfer gain but at the cost of increased number of components and switching devices. Therefore, these topologies of Zeta converter do not suit the proposed water pumping system.

The PV inverters dedicated to the small PV plants must be characterized by a large range for the input voltage in order to accept different configurations of the PV field. This capability is assured by adopting inverters based on a double stage architecture where the first stage, which usually is a dc/dc converter, can be used to adapt the PV array voltage in order to meet the requirements of the dc/ac second stage, which is used to supply an ac load or to inject the produced power into the grid. This configuration is effective also in terms of controllability because the first stage can be devoted to track the maximum power from the PV array, while the second stage is used to produce ac current with low Total Harmonic Distortion (THD).

BLDC motors are preferred over DC motors and induction motors due to their advantages like long operating life, higher efficiency, low maintenance and better speed torque characteristics. Stator windings of BLDC motors are energized in a sequence from an inverter. A bulkier DC link capacitor is connected in between the dc-dc converter and inverter to get a constant voltage at the input of inverter, thus to make the voltage ripple free. But the DC link capacitor is bulkier in size and its life time is affected by operating temperature. Moreover the cost is about 5-15% of overall cost of BLDC motor drive. As an attempt to reduce the cost of motor, DC link capacitor can be eliminated at the expense of torque ripple. Thus a new torque ripple compensation technique is proposed to compensate for the torque ripple associated with the elimination of the DC link capacitor. In this method, torque ripple compensation technique is proposed to a solar PV array fed DC link capacitor free BLDC motor.

Power Quality Improvement of Fuzzy Controlled Reactive Power Compensation in a Grid Connected System for DSTATCOM

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Abstract: A Power quality problem is an occurrence manifested as a nonstandard voltage, current or frequency that results in a failure or a mis-operation of end user equipments. Due to deteriorate the quality of power, other customers which are connected to the same PCC also experiences the poor quality of power so whole system gets affected by these non-linear loads. D-STATCOM solves these problems more efficiently and reliably. Many application of D-STATCOM is in the power systems at the distribution level. It compensates the reactive power, improves power factor, enhances voltage regulation and compensate at fault condition. Here in this project the main concern is harmonic distortion due to non-linear loads and mitigation of current harmonics using D-STATCOM and compensation of reactive power for load and maintains the grid reactive power near to zero using MATLAB/SIMULATION. A fuzzy based controller is also used and compared with conventional controller. Finally performance of the both controllers are compared and analyzed.

I INTRODUCTION

STATCOM [1] and D-STATCOM have similar strategies but objective of these two are different and covers the different area of objective. When STATCOM is connected to the distribution side then it is called D-STATCOM. D STATCOM has the additional advantage in the power systems. It has its own applications viz. to improve power factor, to improve voltage regulation, to maintain three-phase balanced voltage and compensate at the fault condition. DSTATCOM is a shunt connected power electronic device which used self-commutated device like IGBT, IGCT etc. Voltage source converter (VSC) is the main part of the STATCOM. It injects the compensated or harmonic component of the current to cancel out the other harmonic frequency component (other than power frequency). So it acts as an active power filter [3].

II POWER QUALITY

Power quality deals with maintaining a pure sinusoidal waveform of voltage and frequency. Voltage quality concern with deviation of voltage

from ideal voltage (sinusoidal) it is a single frequency sine wave at rated magnitude and frequency with no harmonics. Current quality is a complimentary term of voltage quality concern with a deviation from the ideal current. Current should be in phase with the voltage.

According to IEEE standard 1100, "power quality is the concept of powering and grounding sensitive equipment in a manner that is suitable to the operation of that equipment".

1 Power quality problems

There are so many problems related with quality of power. Here the main concern with the poor power quality with nonlinear loads. Non-linear loads can cause voltage and current distortion. That is it changes its shape other than sinusoidal.

2 Harmonic Distortion

Harmonic components are those waveforms which have the frequency as an integer multiple of the fundamental. Any periodic waveform which is non-sinusoidal can be divided into fundamental and non fundamental components. Every nth harmonic will have a frequency n times that of fundamental frequency [3].

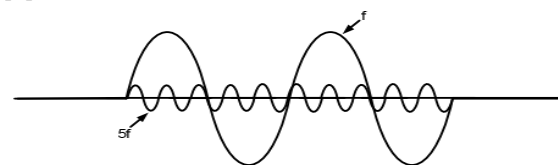


Figure 1: Fundamental component and 5th harmonic component

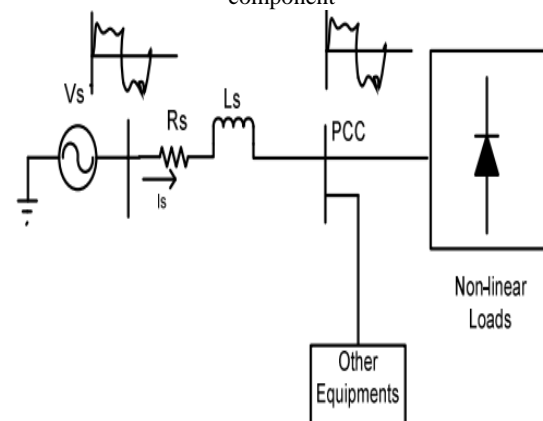


Figure 2: Power System with non-linear loads Voltage at point of common coupling

Automatic Power Meter Reading System Using GSM Network

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Abstract- This paper presents the design of a system to detect the synchronization failure of any external supply source to the power grid on sensing the abnormalities in frequency and voltage and thereby protecting the load. There are several power generation units connected to the grid such as hydra, thermal, solar etc., to supply power to the load. These generating units need to supply power according to the rules of the grid. These rules involve maintaining a voltage variation within limits and also the frequency. If any deviation from the acceptable limit of the grid, it is mandatory that the same feeder should automatically get disconnected from the grid which by effect is termed as islanding. This prevents in large scale brown out or black out of the grid power. So, it is preferable to have a system which can warn the grid in advance so that alternate arrangements are kept on standby to avoid complete grid failure. This system is based on Arduino Uno microcontroller. The microcontroller monitors the under/over voltage being derived from a set of comparators and a standard Arduino is used to vary the input voltage to test the functioning of the paper. A lamp load (indicating a predictable blackout, brownout) being driven from the microcontroller in case of voltage/frequency going out of acceptable range. GPS and GSM technologies are used to indicate the fault location. Key Words: Synchronization, Power Grid, Black Out, Bridge Rectifier, GSM Modem, Arduino UNO, Relay, LCD.

I.INTRODUCTION

1.1 Synchronization Detection of Failures

Power grids are vast complex networks that make up a large part of an infrastructure. Many precautions are taken, and operators hired to maintain reliability, however three fourths of power outages are caused by operator errors. These errors can be avoided by automatic adjustments based on models of the grid system. The model explored is ensuring generator synchronization within the system. Finally, not only will the grid not have destructive interference, constructive interference will occur which increases the total power the grid can produce which optimizes the grid.

The objective of this paper is to detect the failure of synchronization in power grid. This is a demonstration devised to provide such kind of a system that could detect the failure in synchronous working of the power grid in case any external supply source that is supplying to the grid is encountering any kind of abnormalities may be in frequency and voltage levels. This detecting power grid synchronization failure system on sensing frequency or voltage beyond the acceptable range could be used in that power houses where different supply sources are connected parallel together to fulfill the energy demand. This system could be used in home automation system, where the consumer has different energy sources such as solar or wind energy. By using this system, the consumer load could

Industrial Power Control By Integral Cycle Switching Without Generating Harmonics

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ABSTRACT

This paper present integral cycle switching control for industrial power control. The project is designed to achieve integral cycle switching, a method to remove whole cycle, cycles or portions of cycles of an AC signal. It is a wellknown and old method of controlling AC power, especially across linear loads such as heaters used in electric furnace. However the concept of achieving the cycle stealing of voltage waveform by use of microcontroller can be very precise as per the program written in assembly / C language so that the actual time-average voltage or current experienced at the load is proportionately lower than the whole signal if applied to the load. In place of a linear load to be used in the output, a series motor or lamp can be used to verify the output.

Key Words: Integral Cycle Control, Harmonics, , single phase induction motor, Control Strategies, MATLAB Simulation.

INTRODUCTION

AC voltage controller is a power electronic circuit in which fixed ac is converted to variable ac without changing the frequency. The converter circuit consists of SCR as switches and provides variable ac to the load. Speed control of induction motor, Industrial heating and lighting, on load tap changing transformers, soft start of induction motors, ac magnet controls, etc. The most commonly used power electronic circuit for controlling the ac voltage is using two SCR's connected in anti-parallel between source and load. The

control strategy depends upon the gate pulse given to the SCR's. In this project we are using comparator for zero crossing detection which is fed as an interrupt to microcontroller of 8051 family. Here the microcontroller delivers the output based on the interrupt received as the reference for generating triggering pulses. Using these pulses, we drive the opto-isolators for triggering the TRIAC to achieve integral cycle control as per the input switches interfaced to the microcontroller. A lamp is provided in this project in place of a motor for demonstration purpose. easy to use, Self-explanatory kit. The project is designed to achieve integral cycle switching, a method to remove whole cycle, cycles or portions of cycles of an AC signal. It is a well-known and old method of controlling AC power, especially across linear loads such as heaters used in electric furnace. However the concept of achieving the cycle stealing of voltage waveform by use of microcontroller can be very precise as per the program written in assembly / C language so that the actual time-average voltage or current experienced at the load is proportionately lower than the whole signal if applied to the load. In place of a linear load to be used in the output, a series motor or lamp can be used to verify the output. One side effect of utilizing this scheme is an imbalance in the input current or voltage waveform as the cycles are switched on and off across the load. In this project we are using comparator for zero crossing detection which is fed as an interrupt to microcontroller of 8051 family. Here the microcontroller delivers the output based on the interrupt received as

Smart Vehicle Safety System Using Arduino

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Abstract: Vehicle theft is one of the major problems faced by civil society today. Statistics shows vehicles which get stolen only 1 by 4th of them recovered. Current systems uses key and remote to lock the vehicle. At main locations CCTV camera's are present which are used to locate the stolen vehicle. But at many places CCTV camera's are not present. Control of vehicle and knowledge of their location even after theft can help recovery of the stolen vehicle fastly. The proposed system helps to find the location of vehicle using GPS also the vehicle speed is gradually reduced by reducing speed of ignition motor using GPS system. It helps finding the vehicle immediately after knowing its stolen. As GPS system is used, the location is also known. The command sent from mobile goes to the GSM system which is interfaced with controller which reduces the speed of ignition motor and immobilizes it. The developed system is reliable, low cost and user friendly which can help in recovery of vehicle if it gets stolen

Keywords:

Stolen,Recovery,GPS,GSM,Arduino

I.INTRODUCTION

Every year, nearly 36,000 vehicles, which amount to nearly Rs.115 crore, are stolen in India among these, only about 14,500 are traced, often in un-roadworthy conditions, with many components missing. Many vehicles are stolen only because people are provided with the many opportunity to steal the vehicles. Very often, cars are left mproperly secured and unattended. It is only with the installation of anti - theft devices that

a thief's attempts can be frustrated. In 2012, there were about 16 crore vehicles registered in the country while 1.7 lakh got stolen. Despite tall claims made by law-enforcement agencies about their success in controlling car thefts, information tabled in the Lok Sabha shows that as many as 1.65 lakh vehicles were stolen in a single year--2013. Theft with access to keys also Known in some places as "Taken Without Owner's Consent (TWOC)". The unauthorized use of a vehicle in which the owner has allowed the driver to have possession of or easy use to the keys. Often, this is the employee of the vehicle's owner ,adolescent or grown child or of the vehicle's owner who, at other times, may be authorized to use the vehicle. This may be treated differently, depending on the laws, and the owner of the vehicle may choose not to press charges. However, this method also applies to criminals who break into a car and find that the owner has left a spare set of keys in the ar, and use these keys to drive the car away. The other one is Opportunistic theft (i.e),The removal of a vehicle that the owner or operator has left unattended with the keys visibly present, sometimes idling. lternatively, some cars offered for sale are stolen during a 'test drive'. A 'test drive' may also provide a potential thief with insight into where the vehicle keys are stored, so that the thief may return later to steal the vehicle. Tracking systems were developed initially for the shipping industry as they needed to locate where each vehicle was at any instant of time. The real time location is found using GPS technology and transmitted by means of GSM modem. The work in this paper is divided in two stages. 1)

Internet Of Thing (I.O.T) Base Controlling And Monitoring Of Circuit Breaker

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Abstract: This paper discusses “internet of thing (I.O.T) base controlling & monitoring of circuit breaker”. Circuit breakers have a very important role in generation and transmission of electricity and represent a vital of the power system. Reliable operation and monitoring the high voltage circuit breakers represent an important challenge when this activity must be acquired online. This paper presents the architecture of an online monitoring and diagnosis System of electrical equipment which has the role to acquire, to transfer and to process information about the monitored equipment. An interface is designed on top of which different local and system applications can be recorded by the system. The Microcontroller near the circuit breaker section will continuously transmit all the parameters of the circuit breaker to control room and it will be displayed on screen of computer. as well as after C.B trip it gives signal also to GSM module so that due to GSM the texting message can received with fault description only in registered number. After receiving text message the operator or any authorized person give command for set or resetting the breaker. So that we minimize the fault clearing time and Improve maintenance method in circuit breaker increases life time and reliability of the circuit breaker.

Keywords: Monitoring circuit breaker; circuit breaker modeling; generation, transmission and distribution; wireless communication

I.INTRODUCTION

Wireless communication has announced its arrival on big stage and the world is going mobile. We want to control everything and without moving an inch. This remote control of appliances is possible through Embedded Systems. The use of “Embedded System in Communication” has given rise to many interesting applications that ensures comfort and safety to human life. It is very important to closely monitor the circuit breaker in-service behavior to avoid costly outages and loss of production. It is well known that to maintain the system reliability it is necessary to protect the with circuit breaker from different abnormality condition i.e. faults. Distribution Circuit breakers have a long service life if they are operated under rated conditions. However, their life is significantly reduced if they are overloaded, resulting in unexpected failures and loss of supply to a large number of equipments thus effecting system reliability.

Online monitoring and controlling of key operational parameters of distribution circuit breakers can provide useful information about the health of circuit breakers which will help

Simulation of High Step-Up Dual Switch Converter with Coupled Inductor and Voltage Multiplier for Grid Connected System

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Abstract: A novel high step-up converter, which is suitable for a PV cell is proposed in this paper. The proposed converter is composed of the dual switches structure, the coupled inductor, and voltage multiplier cells in order to achieve the high step-up voltage gain. The dual switches structure is beneficial to reduce the voltage stress and current stress of the switch. In addition, two multiplier capacitors are, respectively, charged during the switch-on period and switch-off period, which increases the voltage conversion gain. Meanwhile, the energy stored in the leakage inductor is recycled with the use of clamped capacitors. Thus, two main power switches with low on-resistance and low current stress are available. As the leakage inductor, diode reverse-recovery problem is also alleviated. Therefore, the efficiency is improved. This paper illustrates the operation principle of the proposed converter; discusses the effect of the leakage inductor; analyzes the influence of parasitic parameters on the voltage gain and efficiency, the voltage stresses and current stresses of power devices; and a comparison between the performance of the proposed converter and the previous high step-up converters is performed. In the ordinary voltage step-up situation, the conventional step-up converters, such as the boost converter can satisfy the voltage step-up requirement. However, in the high step-up situation, the conventional converter cannot achieve a high step-up conversion with high efficiency by extreme duty cycle or high turns ratio because of the parasitic parameters or leakage inductance.

Key Words: Dual switches, high step-up converter, switched capacitor, three-winding coupled inductor, Photo Voltaic System.

I. INTRODUCTION

In recent years, the boost dc/dc converters have been widely used to step up the renewable energy sources in various industrial applications such as ESS, UPS, and EV etc. In those applications, boost dc/dc converters generally step up the voltage to the high voltage output. For that reason, to obtain a high voltage gain, many converter topologies were reported [3]-[6] for this application.

Direct voltage step up using high frequency transformer is a Simple and easily controllable converter

providing high gain. Isolated current fed dc-dc converters [7]-[9] are example of this category. However, these topologies result in high voltage spikes across the switch (due to leakage inductance) and large ripple in primary side transformer current as the turn's ratio in the high frequency transformer increases. Most of the non-isolated high voltage gain dc-dc power converters employ coupled inductor (to achieve higher voltage gain) [11] in contrast to a high frequency transformer used by the isolated versions. The coupled inductor-based dc-dc converter has advantages over isolated transformer-based dc-dc converter in minimizing current stress, using lower rating components and simple winding structure. Modeling procedure of the coupled inductor is described in [12]. For high power converter applications, interleaved coupled inductor-based boost converters [13]-[15] have also been proposed.

Voltage gain of the converter can be increased without increasing the duty cycle of the switch by connecting an intermediate capacitor in series with the inductor [6]. The intermediate energy storage capacitor with coupled inductor charges in parallel and discharges in series with the coupled inductor secondary.

A demerit of coupled inductor-based systems is that they have to deal with higher leakage inductance, which causes voltage spikes across the main switch during turn-OFF time and current spike during turn-ON time, resulting in a reduction of the overall circuit efficiency. The effects of leakage inductance can be eliminated by using an active clamp network shown in [9], which provides an alternate path to recover leakage energy. But active clamp network is not as efficient as a passive clamp because of conduction losses across the power switch of the active clamp network. Active clamp network consists of a switch with passive components while passive clamp network [4] consists of passive components such as diode, capacitor, and resistor. The passive clamp circuit is more popular to reduce voltage stress across the converter switch by recycling leakage energy.

To overcome such disadvantages of the conventional converters. A closed-loop control system, a

A Novel method of Current Source Modular Multilevel Converter for fuzzy controller based STATCOM Application

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ABSTRACT- In this paper a multilevel current source converters is utilized for the high power applications with high current low and voltage requirements. Therefore we can totally analysis of a current source modular multilevel converter (CSMMC) with its application such as STATCOM. Fuzzy control is employed to the system for deduction of THD. There are different properties of CSMMC which are correlated with the voltage source modular multilevel converter (VSMMC). There are two method for inductor current balancing they are sub module inductance selection method and a sorting based algorithm which are proposed for CSMMC. Moreover for the switching technique we are implementing the carrier phase shifted sinusoidal pulse width modulation. Here the performance of a converter can be analyzed under non-interleaved and interleaved carrier signals during the upper and lower arms. Here we are using the fuzzy controller compared to other controllers i.e. The fuzzy controller is the most suitable for the human decision-making mechanism, providing the operation of an electronic system with decisions of experts. The proposed STATCOM will display that the transient and steady state performance of the system are satisfactory. By using the simulation results we can analyze the proposed method.

Index Terms—Current balancing, current source modular multilevel converter (CSMMC), Fuzzy logic controller, HVDC transmission, STATCOM.

(I) INTRODUCTION

This paper presents a new control scheme to control a transform less STA–TCOM topology based on multilevel converter (MC) in order to manage more accurate compensation for high-power applications. The main objective of this paper is to analyzed in detail the operation of a CSMMC, a dual of VSMMC, and to investigate its feasibility as a STATCOM. In CSMMC, a variable current source in each converter arm is created using parallel connected inductor SMs. Voltage source modular multilevel converters are used for high power applications. Main features of the VSMMCs include reduced harmonics, lower switching frequency, and reduced stress on each device, amongst others [1]. By using this technique besides minimizing the harmonic level, the inverter unit fundamental output voltages are equalized. Moreover, because of modular structure, scalability

to various power and voltage levels is easily achieved and reliability can be improved by including redundant sub modules in each phase [2]. These features make the VSMMCs more attractive and competitive for HVDC and FACTS applications [3].

In this paper, detail theoretical analysis of CSMMC is presented and various parameters of the converter are correlated with VSMMC. SM inductance selection method and SM inductor current ++balancing strategy are presented for CSMMC. Furthermore, equations are developed in dq frame to design a controller for CSMMC based STATCOM.

The CSCs using fully controllable switches have many advantages than LCCs. The main features of CSCs using self-commutating devices are: 1) independent control of the active and reactive power, 2) it can be operated in weak grids or with passive loads, and 3) relatively small footprint because the ac side filters can be eliminated due to low harmonic distortion [10].

An MMC topology using a modified current source H-bridge cell is proposed, to address the voltage scaling problem. Dynamic performances of the STATCOM during step change in capacitive mode to inductive mode and vice versa, and during ac and dc faults are evaluated.

2. CSMMC STRUCTURE AND OPERATION

Fig. 1 shows one phase of a three phase CSMMC. Each phase of a converter consists of two arms and each arm consists of N parallel connected half bridge SMs and the arm capacitor. The inductors of the SMs act as current sources that can be inserted or bypassed in each arm of the CSMMC. This way the ac output current can be controlled by varying the number of inserted SMs in the upper and lower arms by using appropriate modulation technique. The inductor currents of all SMs are kept balanced by using a balancing technique as explained in Sec. III-B. The arm capacitor, C_{arm} , is dual to the arm inductance of a VSMMC. C_{arm} is considered to be identical for all arms of the converter. The main functions of the arm capacitor are to absorb any unbalances and harmonics generated in the arm currents [22].

Design of an Autonomous Robotic Surveillance and Security System

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Abstract: The development of intelligent surveillance systems is an active research area. In this context, mobile and multi-functional robots are generally adopted as means to reduce the environment structuring and the number of devices needed to cover a given area. Nevertheless, the number of different sensors mounted on the robot, and the number of complex tasks related to exploration, monitoring, and surveillance make the design of the overall system extremely challenging. In this paper, we present our autonomous mobile robot for surveillance of indoor environments. We propose a system able to handle autonomously general-purpose tasks and complex surveillance issues simultaneously. It is shown that the proposed robotic surveillance scheme successfully addresses a number of basic problems related to environment mapping, localization and autonomous navigation, as well as surveillance tasks, like scene processing to detect abandoned or removed objects and people detection and following. The feasibility of the approach is demonstrated through experimental tests using a multisensory platform equipped with a monocular camera, a laser scanner, and an RFID device. Real world applications of the proposed system include surveillance of wide areas (e.g. airports and museums) and buildings, and monitoring of safety equipment.

Keywords: surveillance; site security monitoring; intelligent control; robot sensing systems

I.INTRODUCTION

The increasing need for automated surveillance of indoor environments, such as airports, warehouses, production plants, etc. has stimulated the development of intelligent systems based on mobile sensors. Differently from traditional non-mobile surveillance devices, those based on mobile robots are still in their initial stage of development, and many issues are currently open for investigation (Everett, H., 2003), (DehuaI, Z. et al. 2007). The use of robots significantly expands the potential of surveillance systems, which can evolve from the traditional passive role, in which the system can only detect events and trigger alarms, to active surveillance, in which a robot can be used to interact with the environment, with humans or with other robots for more complex cooperative actions (Burgard, W. et al. 2000), (Vig, L. & Adams, J.A., 2007).

In the last years, several worldwide projects have attempted to develop mobile security platforms. A notable example is the Mobile Detection Assessment and Response System (MDARS) (Everett, H. & Gage, D. W., 1999). The aim of this project was that of developing a multi-robot system able to inspect warehouses and storage sites, identifying anomalous situations, such as flooding and fire, detect intruders, and determine the status of inventoried objects using specialized RF transponders. In the RoboGuard project (Birk, A. & Kenn, H., 2001), a semi-autonomous mobile security device uses a behavior-oriented architecture for navigation, while sending video streams to human watch-guards.

Solar Energy Measurement System Over Wifi

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Abstract - Using the Internet of Things Technology for supervising solar power generation can greatly enhance the performance, monitoring and maintenance of the plant. With advancement of technologies the cost of renewable energy equipment is going down globally encouraging large scale solar plant installations. This massive scale of solar system deployment requires sophisticated systems for automation of the plant monitoring remotely using web based interfaces as majority of them are installed in inaccessible locations and thus unable to be monitored from a dedicated location. The Project is based on implementation of new cost effective methodology based on IoT to remotely monitoring a solar plant for performance evaluation. This will facilitate preventive maintenance, fault detection of the plant in addition to real time monitoring

Key Words: Power Measurement, Wireless Transmission, Internet Of Things, Thingspeak, ATmega 328.

1.INTRODUCTION

Solar power plants need to be monitored for optimum power output. This helps retrieve efficient power output from power plants while monitoring for faulty solar panels, connections, and dust accumulated on panels lowering output and other such issues affecting solar performance. So here we propose an automated IOT based solar power monitoring system that allows for automated solar power monitoring from anywhere over the internet. We use ATmega controller based system to monitor solar panel parameters. Our system constantly monitors the solar panel and transmits the power output to IOT system over the internet. Here we use IOT Thingspeak to

transmit solar power parameters over the internet to IOT Thingspeak server. It now displays these parameters to the user using an effective GUI and also alerts user when the output falls below specific limits. This makes remotely monitoring of solar plants very easy and ensures best power output.

Real time monitoring systems in photovoltaic (PV) power generation are very important and urgent in some cases. This paper proposes a real time monitoring system for solar panel using the Atmega 2560 arduino which is connected with voltage sensor, current sensor and temperature sensor. The Arduino ATmega 2560 also connects with the Wifi module as a connection to the smartphone to display the measurements of current, voltage and power of solar panel and ambient temperatures through the Blynk app. This system is tested for seven days starting at 08.00 am to 04.00 pm. The designed monitoring system has a good degree of accuracy with an average error rate of monitoring results of solar panel output value below 10%. Monitoring the performance of solar panels using a smartphone-based microcontroller can be done in real time. The monitoring system can be developed for the larger PV systems.

The photovoltaic panel (PV) consists of a collection of photovoltaic cells mounted to convert solar radiation into electrical energy through a photoelectric effect. Photovoltaic cells are made of silicon and extracted from the raw material of quartzite gravel. During the process, the quartz is crushed to obtain silicon dioxide and the raw materials need to undergo substantial processing until it can be used to produce photovoltaic cells

REAL TIME VEHICLE TRACKING SYSTEM USING GSM AND GPS

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Abstract- : Currently almost of the public having an own vehicle, theft is happening on parking and sometimes driving insecurity places. The safe of vehicles is extremely essential for public vehicles. Vehicle tracking and locking system installed in the vehicle, to track the place and locking engine motor. The place of the vehicle identified using Global Positioning system (GPS) and Global system mobile communication (GSM). These systems constantly watch a moving Vehicle and report the status on demand. When the theft identified, the responsible person send SMS to the microcontroller, then microcontroller issue the control signals to stop the engine motor. Authorized person need to send the password to controller to restart the vehicle and open the door. This project also indicates speed of vehicle which can be calculated by using distance and time. This is more secured, reliable and low cost. **KEYWORDS:** Vehicle Tracking, Fuel and Speed indicator, GSM and GPS

I.INTRODUCTION

In the last few decades, India has progressed at such an enormous rate that many companies have strongly established themselves here. These companies bring a huge amount of workforce with them. Arranging transportation to such a huge mass is a cumbersome task involving many intricacies. Generally, this transport is arranged through the local transport vendors on a yearly contract basis, recently happen mishaps such as burglary, rape cases etc. The development of satellite

communication technology is easy to identify the vehicle locations. Vehicle tracking systems have brought this technology to the day-to-day life of the common person. Today GPS used in carsambulances; fleets and police vehicles are common sights on the roads of developed countries. All the existing technology support tracking the vehicle place and status The GPS/GSM Based System is one of the most important systems, which integrate both GSM and GPS technologies. It is necessary due to the many of applications of both GSM and GPS systems and the wide usage of them by millions of people throughout the world. This system designed for users in land construction and transport business, provides real-time information such as location, speed and expected arrival time of the user is moving vehicles in a concise and easy-to-read format. This system may also useful for communication process among the two points. Currently GPS vehicle tracking ensures their safety as travelling. This vehicle tracking system found in clients vehicles as a theft prevention and rescue device. Vehicle owner or Police follow the signal emitted by the tracking system to locate a robbed vehicle in parallel the stolen vehicle engine speed going to decreased and pushed to off. After switch of the engine, motor cannot restart without permission of password. This system installed for the four wheelers, Vehicle tracking usually used in navy operators for navy management

Smart Wireless Battery Charging With Charge Monitor

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Abstract: IoT technology has been playing an increasingly important role in the development of modern technology. The idea of —smart devices, which are able to regulate and maintain themselves as well as respond to external stimuli has led to the new paradigm in appliance manufacturing, of which the household appliance and the electrical industries are the most affected. Also, on a side note, there have been many strides in wireless power transfer technology, some of which are great improvements in efficiency and reduction in size, which bring the technology closer to household applications. This project effectively aims to utilize the conjunction of the two aforementioned technologies to create a prototype of a smart appliance, a battery charging station powered wirelessly and integrated with IoT technology, which enable the user to continuously monitor the critical parameters of the battery, such as charge level, input and output current, etc.. The logged data can also be accessed from anywhere, such as a smartphone or a PC, due to it's easy availability as it is uploaded to the cloud. Thus, this project synthesizes a new generation of electronic devices, as demonstrated by the above discussed prototype

Index Terms: IoT, WPT, Inverter, Cloud, appliance, prototype

I.INTRODUCTION

Smart devices are the new generation of devices whose primary characteristic is that they are capable of networking among themselves and with outside agents such as PCs, Smartphones, etc., utilizing an array of

wireless communication protocols like Bluetooth, Zigbee, NFC, Wi-Fi, LiFi, 3G, etc. The word —smart may also refer to a device that exhibits certain computing properties, like artificial intelligence, though not always. Smart devices can be designed to support a number of environments, a range of various computing properties, and be used in three major areas: physical world, human-centered environments, and distributed computing environments. Usually, smart devices consist



Fig 1. A collection of smart devices

1.1 IoT Technology:

IoT refers to the Internet of Things, which are a series of interrelated computing devices, mechanical or virtual computers, artifacts, animals and individuals with unique identifiers (UIDs) and the ability to transfer information over a network without the need for human-to-human or human-to-computer communication. IoT devices can be either used as standalone

Simulation of closed loop control of Solar PV Array-Fed Water Pumping System Using Zeta Converter of BLDC Motor Drive

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Abstract: This paper proposes a solar photovoltaic (SPV) array fed water pumping system utilizing a zeta converter as an intermediate DC-DC converter in order to extract the maximum available power from the SPV array. Controlling the zeta converter in an intelligent manner through the incremental conductance maximum power point tracking (INC-MPPT) algorithm offers the soft starting of the brushless DC (BLDC) motor employed to drive a centrifugal water pump coupled to its shaft. Soft starting i.e. the reduced current starting inhibits the harmful effect of the high starting current on the windings of the BLDC motor. A fundamental frequency switching of the voltage source inverter (VSI) is accomplished by the electronic commutation of the BLDC motor, thereby avoiding the VSI losses occurred owing to the high frequency switching. A new design approach for the low valued DC link capacitor of VSI is proposed. The proposed water pumping system is designed and modeled such that the performance is not affected even under the dynamic conditions. Suitability of the proposed system under dynamic conditions is demonstrated by the simulation results using MATLAB/Simulink software.

Key words: Brushless dc (BLDC) motor, incremental conductance maximum power point tracking (INC-MPPT), solar photovoltaic (SPV) array, voltage-source inverter (VSI), waterpump, zeta converter

I. Introduction

Severe environmental protection regulations, shortage of fossil fuels and eternal energy from the sun have motivated these researchers towards the solar photovoltaic (SPV) array generated electrical power for various applications [1]. Water pumping is receiving wide attention nowadays amongst all the applications of SPV array. To enhance the efficiency of SPV array and hence the whole system regardless of the operating conditions, it becomes essential to operate SPV array at its maximum power point by means of a maximum power point tracking (MPPT) algorithm [2-4]. Various DC-DC converters have been already employed to accomplish this action of MPPT. Nevertheless, a Zeta converter [5-9] based MPPT is still unexplored in any kind of SPV array based applications. An incremental conductance (INC) MPPT algorithm [2] is used in this work in order to generate an optimum value of duty cycle for the IGBT

(Insulated Gate Bipolar Transistor) switch of Zeta converter such that the SPV array is constrained to operate at its MPP. Various configurations of Zeta converters such as self-lift circuit, re-lift circuit, triple-lift circuit and quadruple-lift circuit using voltage lift (VL) technique have been reported in aforementioned topologies have high voltage transfer gain but at the cost of increased number of components and switching devices. Therefore, these topologies of Zeta converter do not suit the proposed water pumping system.

The PV inverters dedicated to the small PV plants must be characterized by a large range for the input voltage in order to accept different configurations of the PV field. This capability is assured by adopting inverters based on a double stage architecture where the first stage, which usually is a dc/dc converter, can be used to adapt the PV array voltage in order to meet the requirements of the dc/ac second stage, which is used to supply an ac load or to inject the produced power into the grid. This configuration is effective also in terms of controllability because the first stage can be devoted to track the maximum power from the PV array, while the second stage is used to produce ac current with low Total Harmonic Distortion (THD).

BLDC motors are preferred over DC motors and induction motors due to their advantages like long operating life, higher efficiency, low maintenance and better speed torque characteristics. Stator windings of BLDC motors are energized in a sequence from an inverter. A bulkier DC link capacitor is connected in between the dc-dc converter and inverter to get a constant voltage at the input of inverter, thus to make the voltage ripple free. But the DC link capacitor is bulkier in size and its life time is affected by operating temperature. Moreover the cost is about 5-15% of overall cost of BLDC motor drive. As an attempt to reduce the cost of motor, DC link capacitor can be eliminated at the expense of torque ripple. Thus a new torque ripple compensation technique is proposed to compensate for the torque ripple associated with the elimination of the DC link capacitor. In this method, torque ripple compensation technique is proposed to a solar PV array fed DC link capacitor free BLDC motor.

Power Quality Improvement of Fuzzy Controlled Reactive Power Compensation in a Grid Connected System for DSTATCOM

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Abstract: A Power quality problem is an occurrence manifested as a nonstandard voltage, current or frequency that results in a failure or a mis-operation of end user equipments. Due to deteriorate the quality of power, other customers which are connected to the same PCC also experiences the poor quality of power so whole system gets affected by these non-linear loads. D-STATCOM solves these problems more efficiently and reliably. Many application of D-STATCOM is in the power systems at the distribution level. It compensates the reactive power, improves power factor, enhances voltage regulation and compensate at fault condition. Here in this project the main concern is harmonic distortion due to non-linear loads and mitigation of current harmonics using D-STATCOM and compensation of reactive power for load and maintains the grid reactive power near to zero using MATLAB/SIMULATION. A fuzzy based controller is also used and compared with conventional controller. Finally performance of the both controllers are compared and analyzed.

I INTRODUCTION

STATCOM [1] and D-STATCOM have similar strategies but objective of these two are different and covers the different area of objective. When STATCOM is connected to the distribution side then it is called D-STATCOM. D STATCOM has the additional advantage in the power systems. It has its own applications viz. to improve power factor, to improve voltage regulation, to maintain three-phase balanced voltage and compensate at the fault condition. DSTATCOM is a shunt connected power electronic device which used self-commutated device like IGBT, IGCT etc. Voltage source converter (VSC) is the main part of the STATCOM. It injects the compensated or harmonic component of the current to cancel out the other harmonic frequency component (other than power frequency). So it acts as an active power filter [3].

II POWER QUALITY

Power quality deals with maintaining a pure sinusoidal waveform of voltage and frequency. Voltage quality concern with deviation of voltage

from ideal voltage (sinusoidal) it is a single frequency sine wave at rated magnitude and frequency with no harmonics. Current quality is a complimentary term of voltage quality concern with a deviation from the ideal current. Current should be in phase with the voltage.

According to IEEE standard 1100, "power quality is the concept of powering and grounding sensitive equipment in a manner that is suitable to the operation of that equipment".

1 Power quality problems

There are so many problems related with quality of power. Here the main concern with the poor power quality with nonlinear loads. Non-linear loads can cause voltage and current distortion. That is it changes its shape other than sinusoidal.

2 Harmonic Distortion

Harmonic components are those waveforms which have the frequency as an integer multiple of the fundamental. Any periodic waveform which is non-sinusoidal can be divided into fundamental and non fundamental components. Every nth harmonic will have a frequency n times that of fundamental frequency [3].

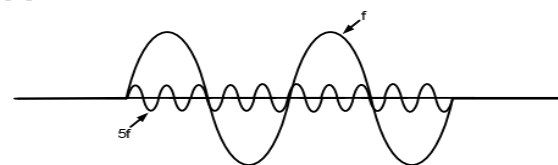


Figure 1: Fundamental component and 5th harmonic component

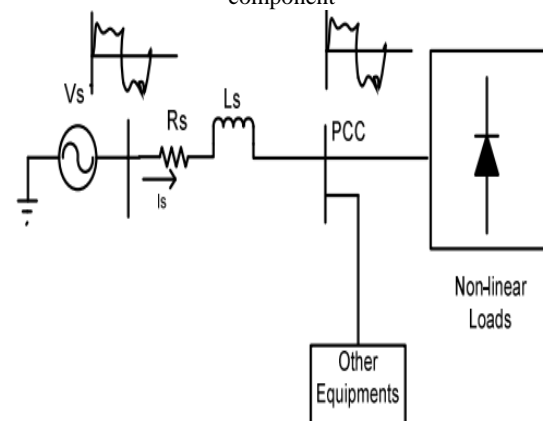


Figure 2: Power System with non-linear loads Voltage at point of common coupling

Design and Analysis of High Speed and Low Power Reversible Vedic Multiplier Incorporating with QSDN Adder

Karanam Deepak.

Abstract: This present work deals with a reversible Vedic type multiplier using the earliest Urdhva Tiryagbhyam sutras of Vedic type mathematics combine with the QSD adder (Quaternary Signed digit number adder). There are three activities be intrinsic into duplication halfway items age, fractional items decrease and expansion. Quick snake design in this way enormously upgrades the speed of the general procedure. A pass on free math errand be able to be cultivated use a top radix number formation, for instance, QSD adder. In QSD, each one number can be address by a digit as of - 3 to 3. Pass on complimentary development as well as distinctive exercises on incalculable, for instance, 64, 128, or more can be executed with consistent deferment and less multifaceted nature. The proposed multiplier configuration is contrasted and a reversible Vedic multiplier consolidates a QSD Quaternary Signed digit number adder viper among a transformation section for quaternary to paired change. The proposition demonstrates a most extreme speed enhancement.

Keywords: Arithmetic Multiplier, Quaternary Signed Digit adder [QSD], UrdhvaTiryagbhyam, Vedic type Mathematics, Carry free addition, QSD, Redundancy.

I. INTRODUCTION

The basic characteristics that assist us choose the calculation force of a pc is the speediness of its math unit. A basic limit of the number juggling square is increase on the grounds that, in most logical estimations, it shapes most of the implementation period. Thusly, the headway of the speedy multiplier has a result investigate zone used for a extended period[1]. A part of the indispensable figuring's planned for snappy enlargement in a composing are Array multiplier, Booth multiplier, and Wallace multipliers. Vedic type Mathematics is a technique is a number juggling decides to facilitate takes into consideration increasingly proficient executions with respect to speed. Increase in this technique comprises of three stages: age of fractional items, decrease of halfway items, lastly convey spread expansion. Multiplier configuration dependent on Vedic arithmetic has numerous points of interest as the deficient things and totals are made in one phase, which decreases the pass on expansion since least significant bit (LSB) number to most significant bit (MSB) number[2]. These components help in scales the main structure used for greater commitments not including moderately extending the main expansion hold-up since each

and every tinier square of the structure work all the while. Vedic multiplier demonstrated upgrades in both the parameters over various structures. Thusly, various use of increment counts subject to Vedic type sutras contains represented inside composing[3]. Vedic type multiplier designs planned in composing rely upon UrdhvaTiryagbhyam type sutras and Nikhilam type sutras of Vedic type Mathematics. After Nikhilam type sutra is gainful designed for wellsprings of information with the purpose of are close up to the force of 10, during the present paper arrangements to execute quick duplication reliant taking place the Urdhva type Tiryagbhyam sutra of Vedic type Mathematics is summed up method for all numbers, has been shown[4]. The previous development, pass on induce extension, requires a speedy snake plot since it shapes a bit of the fundamental way. Collections of snake designs contain projected within writing towards enhance the entire execution of the Vedic type multiplier. Snake reliant on Quaternary Signed digit number type adder exhibits the upgrade in speed above former front line adders. Earlier utilization of QSD snake relied upon the Multi Voltage logic or the Multi Value type Logic (MVL). The inconvenience being used of the quaternary type extension exterior the Multiple Voltage justification is so as to, the main snake is the simply a little piece of the main structure and the yields ought towards be changed over backside towards match for additional getting ready. Regardless, usages of the change unit undermine the good conditions grabbed within speed beside with QSD type adder. In the present manuscript, a new execution of the a snake reliant on the adder of QSD type is projected, In which diminishes the pass on expansion interruption of the arrangement through creation make use of of pass on liberated math. The New method of proposed system snake configuration deals with a half and half of double and quaternary number frameworks wherein the total is straightforwardly created in parallel utilizing the idea of a changing piece, wiping out the transformation module. The structure can be scaled to bigger piece usage, for example, 32 bits, 64bits, 128 bits or added through insignificant increment during spread postpone attributable on the way to the affinity pre-dominant within the same plan. We include differentiated present proposed structure and the Vedic type multiplier subject to the New Multi Value type Logic (MVL) method of reasoning that uses a swell pass on snake, the Vedic type Multiplier with the purpose of intertwines a Quaternary Signed digit number adder type adder wind along with a change component used for the quaternary headed for matched change,

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A New Method of Five Level Single-Stage Power Factor Correction of AC–DC Converter for Industry Applications

M Rama Prasad Reddy, Karanam Deepak, Y Hazarathaiiah

Abstract: In this article proposed a simulation of three-phase PFC AC-DC single stage 5 level converters uses capacitors in series. In the proposed 5 level converters utilize a flying capacitor arrangement through a normal phase shift Pulse Width Modulation toward develop efficiency, principally on light load circumstances. The implementation of the new method of three phase conventional method three level and proposed five level of the integrated AC – DC converter. The main advantages of the proposed rectifier are compared to conventional converter, with high input power factor and also it reduces harmonics of the input current. The possibility of the new 5 level converters is established with recreation results obtain from a proposed system converter. The proposed 5 level converter integrate the function of the improve PFC along with the five-level converter. During the proposed rectifier can be operated with low voltage stress along with control and the dc bus capacitors while it is five level converters is used in proposed converters. So the proposed method is more capable because of using very less diodes in the dc busses. The turn on losses is very less in proposed system. So in this paper proposed those 3 levels is implemented to five levels AC-DC converter for PFC correction.

Keywords: PFC (Power Factor Correction), 5 level converters, AC-DC converter for PFC correction, PWM Pulse Width Modulation, phase shift Pulse Width Modulation.

I. INTRODUCTION

In the Three phase converters like ac-dc contain be urbanized toward a developed level through the power quality improvement within provisions of power- factor correction (PFC), its reduces the THD (total Harmonic distortions) at the input side of the ac mains, and the output voltage is synchronized in dc output. By using buck converter, buck-boost converter, boost converter, multilevel converter and multi pulse modes of converter with operated in both unidirectional and bidirectional directions power flow. And

In the three phase converters of ac-dc renovation of electrical power is commonly used in ASDs [1], UPS AND high voltage direct current transmission, with the renewable applications like solar system, battery storage systems, in development knowledge such as electroplating system, welding unit systems, and battery charging of the EHV (Electric Vehicles) and also implemented in telecommunication systems [2][3]. In conventional method the ac-dc converters are recognized like rectifiers. These rectifiers are urbanized by via the diodes and also using semi conductor devices like thyristors to offer the both controlled and uncontrolled dc power. And these converters having main problem is power quality issues nothing but a voltage distortion problems, harmonic distortion problem, and poor power factor problems, complex size of using filters of both ac and dc filters [3][4]. so due this drawbacks in the present rectifiers are developed with new power electronic devices like IGBT'S, MOSFETS, and also used GTO'S. So in proposed technique we can develop the rectifier circuit by using the above power electronic devices. And the converters are classified as 1) Multi level converters 2) multi pulse converters 3) power factor type of converters 4) switched converters. Etc. So for the reason that of the firm condition of PQ is needed on the system effort side of ac mains, a number of principles contain the urbanized as well as compulsory happening the customers. Since the strictness of the power quality troubles a few additional options like passive filters of the system, and Active power Filters, as well as also used cross filters all along through the previous rectifiers have been widely urbanized, mainly for the large voltage rating and previously accessible installations[5][6]. But, the cost of the filters is high, complex in size and has sensible losses, which decrease the on the whole effectiveness of the entire scheme. During a few cases the converter evaluation of APF's is approximately secure toward the evaluation of the output ratings. Due to those conditions, it is consider the improved alternative to utilize such converters as a natural component of the proposed structure of the AC-DC conversion, and the features of the proposed converter is size is reduced, efficiency is high and also controlled the generated DC to supply contented and flexible type of procedure of the system. It is consider appropriate challenge toward there a extensive point of view happening the position of proposed ac-dc converters equipment in favor of the engineers by means of them as well as commerce through PQ problems. The present manuscript is proposed that a new five level single stage five level Ac-dc PFC converter.

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Simulation of Fuzzy logic controller based MLI-STATCOM with Synchronous Reference Frame in Power Distribution Network

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Abstract: In this Project Fuzzy based MLI-STATCOM with Synchronous reference frame in Distribution network is presented. In Modern distribution systems have very complex networks connected with linear and nonlinear loads. The presence of harmonics in system it will effected with power quality problems. Due to this high amount of power losses and disoperation of power electronics devices is caused, along with this Harmonics have a number of undesirable effects like Voltage disturbances. These harmonics are needed to mitigate for Power Quality Enhancement in distributed system. To suppress harmonics and other power quality issues related to current, Distribution Static Compensator (DSTATCOM) connected across load is proved to be effective. DSTATCOM is one of the FACTS Devices which can be used to mitigate the harmonics. This paper proposes a five-level diode clamped Multilevel Inverter based Distribution STATCOM (MLI-DSTATCOM) with Synchronous Reference Frame based control for harmonic mitigation. The voltage source converter is core of the DSTATCOM and the hysteresis current control is indirect method of controlling of VSC. In this paper we implement with SRF based DSTATCOM control. SRF theory is implemented for the generation of controlling reference current signals for controller of DSTATCOM. A fuzzy logic control scheme is proposed for the controlling operation of STATCOM. The system performance will analyzed .In extension by implementing fuzzy logic control to the system the harmonics are mitigated in the distribution system and Total harmonic distortion will be reduced.

Keywords—Multilevel Inverter based Distributed STATCOM (MLI-DSTATCOM); Synchronous Reference Frame (SRF); Power Quality (PQ); Harmonic Mitigation; Active Power Filter (APF); Total Harmonic Distortion (THD).

1. INTRODUCTION

Rising apprehension for rising cost of energy, environmental impacts due to the use of fossil fuels, fast diminution of fossil fuels reserves and it is indispensable to reduce green house gas emissions encouraged the development of the renewable energy. Of all the

renewable energy sources, wind power has undergone colossal development in recent years because wind power is pollution free and cost effective [1-2]. Performance of any CPDs is greatly reckoning on the gating pulses and also the management rule to get calculable reference currents. Few management algorithms principally utilized area unit feed forward coaching [6], SRF theory and instant active and reactive power theory [9] –[12], Lyapunov-function management [13] and also the non-linear management technique [14] etc. Performance of MLI-DSTATCOM is analyzed during this paper with nonlinear, balanced/unbalanced load. With the planned management methodology, load currents, supply currents and supply voltages area unit measured. Total Harmonic Distortion (THD) of offer currents with standard two-level DSTATCOM, threelevel diode clamped and five-level diode clamped MLIDSTATCOM is developed and analyzed in Matlab/Simulink code. This study has been swollen to active and reactive power flow analysis. This paper is organized as following: Section II explains DSTATCOM operation. Section III explains SRF management for DSTATCOM. Section IV discusses observations made up of results. Section V concludes work.

The fast growth and reputation of power electronics technology lead to wide use of industry loads which posses' power quality (PQ) issues [1]. The power quality is primarily exaggerated due to current harmonics introduced by the nonlinear loads into the distribution network. The PQ issues featured with harmonic distortion, low power factor and phase disproportion produce astonishing turbulence in the function of electrical equipment [2]. Conventionally, static capacitors and passive filters have been employed to enhance PQ in distribution system. Nevertheless, these frequently have issues like fixed compensation, system parameters dependent performance and probable resonance with line reactance [3]. Owing to this the capability to even out the transmission systems and to enhance PQ in distribution systems is showed [6]. Distribution Static synchronous compensator (DSTATCOM) is prevalently acknowledged as a consistent reactive power controller substituting

Simulation of High Step-Up Dual Switch Converter with Coupled Inductor and Voltage Multiplier for Grid Connected System

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Abstract: A novel high step-up converter, which is suitable for a PV cell is proposed in this paper. The proposed converter is composed of the dual switches structure, the coupled inductor, and voltage multiplier cells in order to achieve the high step-up voltage gain. The dual switches structure is beneficial to reduce the voltage stress and current stress of the switch. In addition, two multiplier capacitors are, respectively, charged during the switch-on period and switch-off period, which increases the voltage conversion gain. Meanwhile, the energy stored in the leakage inductor is recycled with the use of clamped capacitors. Thus, two main power switches with low on-resistance and low current stress are available. As the leakage inductor, diode reverse-recovery problem is also alleviated. Therefore, the efficiency is improved. This paper illustrates the operation principle of the proposed converter; discusses the effect of the leakage inductor; analyzes the influence of parasitic parameters on the voltage gain and efficiency, the voltage stresses and current stresses of power devices; and a comparison between the performance of the proposed converter and the previous high step-up converters is performed. In the ordinary voltage step-up situation, the conventional step-up converters, such as the boost converter can satisfy the voltage step-up requirement. However, in the high step-up situation, the conventional converter cannot achieve a high step-up conversion with high efficiency by extreme duty cycle or high turns ratio because of the parasitic parameters or leakage inductance.

Key Words: Dual switches, high step-up converter, switched capacitor, three-winding coupled inductor, Photo Voltaic System.

I. INTRODUCTION

In recent years, the boost dc/dc converters have been widely used to step up the renewable energy sources in various industrial applications such as ESS, UPS, and EV etc. In those applications, boost dc/dc converters generally step up the voltage to the high voltage output. For that reason, to obtain a high voltage gain, many converter topologies were reported [3]-[6] for this application.

Direct voltage step up using high frequency transformer is a Simple and easily controllable converter

providing high gain. Isolated current fed dc-dc converters [7]-[9] are example of this category. However, these topologies result in high voltage spikes across the switch (due to leakage inductance) and large ripple in primary side transformer current as the turn's ratio in the high frequency transformer increases. Most of the non-isolated high voltage gain dc-dc power converters employ coupled inductor (to achieve higher voltage gain) [11] in contrast to a high frequency transformer used by the isolated versions. The coupled inductor-based dc-dc converter has advantages over isolated transformer-based dc-dc converter in minimizing current stress, using lower rating components and simple winding structure. Modeling procedure of the coupled inductor is described in [12]. For high power converter applications, interleaved coupled inductor-based boost converters [13]-[15] have also been proposed.

Voltage gain of the converter can be increased without increasing the duty cycle of the switch by connecting an intermediate capacitor in series with the inductor [6]. The intermediate energy storage capacitor with coupled inductor charges in parallel and discharges in series with the coupled inductor secondary.

A demerit of coupled inductor-based systems is that they have to deal with higher leakage inductance, which causes voltage spikes across the main switch during turn-OFF time and current spike during turn-ON time, resulting in a reduction of the overall circuit efficiency. The effects of leakage inductance can be eliminated by using an active clamp network shown in [9], which provides an alternate path to recover leakage energy. But active clamp network is not as efficient as a passive clamp because of conduction losses across the power switch of the active clamp network. Active clamp network consists of a switch with passive components while passive clamp network [4] consists of passive components such as diode, capacitor, and resistor. The passive clamp circuit is more popular to reduce voltage stress across the converter switch by recycling leakage energy.

To overcome such disadvantages of the conventional converters. A closed-loop control system, a

A Novel method of Current Source Modular Multilevel Converter for fuzzy controller based STATCOM Application

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ABSTRACT- In this paper a multilevel current source converters is utilized for the high power applications with high current low and voltage requirements. Therefore we can totally analysis of a current source modular multilevel converter (CSMMC) with its application such as STATCOM. Fuzzy control is employed to the system for deduction of THD. There are different properties of CSMMC which are correlated with the voltage source modular multilevel converter (VSMMC). There are two method for inductor current balancing they are sub module inductance selection method and a sorting based algorithm which are proposed for CSMMC. Moreover for the switching technique we are implementing the carrier phase shifted sinusoidal pulse width modulation. Here the performance of a converter can be analyzed under non-interleaved and interleaved carrier signals during the upper and lower arms. Here we are using the fuzzy controller compared to other controllers i.e. The fuzzy controller is the most suitable for the human decision-making mechanism, providing the operation of an electronic system with decisions of experts. The proposed STATCOM will display that the transient and steady state performance of the system are satisfactory. By using the simulation results we can analyze the proposed method.

Index Terms—Current balancing, current source modular multilevel converter (CSMMC), Fuzzy logic controller, HVDC transmission, STATCOM.

(I) INTRODUCTION

This paper presents a new control scheme to control a transform less STA–TCOM topology based on multilevel converter (MC) in order to manage more accurate compensation for high-power applications. The main objective of this paper is to analyzed in detail the operation of a CSMMC, a dual of VSMMC, and to investigate its feasibility as a STATCOM. In CSMMC, a variable current source in each converter arm is created using parallel connected inductor SMs. Voltage source modular multilevel converters are used for high power applications. Main features of the VSMMCs include reduced harmonics, lower switching frequency, and reduced stress on each device, amongst others [1]. By using this technique besides minimizing the harmonic level, the inverter unit fundamental output voltages are equalized. Moreover, because of modular structure, scalability

to various power and voltage levels is easily achieved and reliability can be improved by including redundant sub modules in each phase [2]. These features make the VSMMCs more attractive and competitive for HVDC and FACTS applications [3].

In this paper, detail theoretical analysis of CSMMC is presented and various parameters of the converter are correlated with VSMMC. SM inductance selection method and SM inductor current ++balancing strategy are presented for CSMMC. Furthermore, equations are developed in dq frame to design a controller for CSMMC based STATCOM.

The CSCs using fully controllable switches have many advantages than LCCs. The main features of CSCs using self-commutating devices are: 1) independent control of the active and reactive power, 2) it can be operated in weak grids or with passive loads, and 3) relatively small footprint because the ac side filters can be eliminated due to low harmonic distortion [10].

An MMC topology using a modified current source H-bridge cell is proposed, to address the voltage scaling problem. Dynamic performances of the STATCOM during step change in capacitive mode to inductive mode and vice versa, and during ac and dc faults are evaluated.

2. CSMMC STRUCTURE AND OPERATION

Fig. 1 shows one phase of a three phase CSMMC. Each phase of a converter consists of two arms and each arm consists of N parallel connected half bridge SMs and the arm capacitor. The inductors of the SMs act as current sources that can be inserted or bypassed in each arm of the CSMMC. This way the ac output current can be controlled by varying the number of inserted SMs in the upper and lower arms by using appropriate modulation technique. The inductor currents of all SMs are kept balanced by using a balancing technique as explained in Sec. III-B. The arm capacitor, C_{arm} , is dual to the arm inductance of a VSMMC. C_{arm} is considered to be identical for all arms of the converter. The main functions of the arm capacitor are to absorb any unbalances and harmonics generated in the arm currents [22].