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A Review on Privacy Preserving Authentication in VANETs

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***Abstract*-The potential growth in Mobile ad-hoc Network triggered the Vehicular ad-hoc network (VANET) for traffic security and efficiency on roads, because once deployed they could bring a new environment to drivers.Vehicular communication in real time environment makes privacy a real challenge, which might affect the large scale deployment of VANETs. Researchers have proposed many solutions to these problems. This paper provides a detailed study on different privacy preserving authentication algorithms in vehicular communication.We start the paper with an introduction to system architecture and the requirements needed. Detailed discussion on different algorithms comes afterwards.**

Keywords- Authentication , Privacy ,Vehicular ad hoc network(VANET)

INTRODUCTION

Vehicular Ad hoc Network (VANET) is considered as one of the subsets of Mobile ad hoc Network(MANET),which is an interesting topic for researches.In VANET each vehicles and it's associated blocks are treated as nodes which communicate among themselves inside the network.Thus in VANET vehicle to vehicle (V2V) and Infrastructure to vehicle communication (I2V) are present.All the vehicles become smart as On Board Units (OBU) is installed which integrate the wireless communications between vehicles, micro sensors, embedded systems.These smart vehicles can improve the driving experience by efficient exchange of messages among vehicles.Moreover, drivers could be more aware by their driving environment if messages concerning real-time traffic conditions are properly transmitted and received.

Despite these prons.[11] VANET has come with their own set of challenges, particularly in the aspect of privacy. Lack of authenticated data shared in the network leads to malicious attacks and service abuses, which leads great threat to drivers. Furthermore, as an example of Mobile Ad hoc Network (MANET), the challenges and issues faced by MANET are inherent in VANET too. Moreover, VANETs are more challenging due to their high mobility and large scale deployment. Therefore a novel mechanism to be needed to guarantee the basic requirement of VANET such as authentication, integrity and nonrepudiation.

To enlighten the readers a system architecture and it's requirements are provided in the introduction.

II SYSTEM ARCHITECTURE AND REQUIREMENTS

The 3 main parts of a VANET system is described as follows

1)Trusted Authority (TA): A TA is the main trusted administration in the Vanet network.It has sufficient computational and storage resources in order to get register the vehicles.It controls the RSU unit and provide proper master keys for communication.

2) Road Side Units (RSU): These are infrastructures like traffic post fixed on the road side.It is not trustworthy always since attackers can easly attack and get information from this.RSU is the entity which directly communicate with vehicles.

3)Vehicles : These are the moving nodes in the wireless sensor network.They have a On Board Unit(OBU) as well as Tamper Proof Devices.OBU helps to communicate the vehicle with other vehicles and the RSU.TPDs helps for cryptographic operations

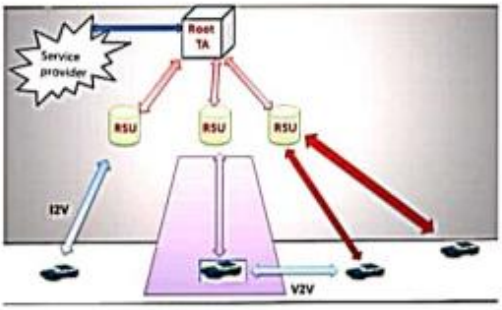

Figure 1 : A typical vanet scenario

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Extreme learning machine based classification for detecting micro-calcification in mammogram using multi scale features

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Abstract- **In the human body, there are some genes that are lead to the growth of the cells .The mutation of these genes are called cancer. Breast cancer is higher in women, and which will causes largest number of cancer related deaths among women. Breast cancer rates are higher among women in many countries. To increase the results of breast cancer and survival, early diagnosis is crucial. There are two early screening plans for breast cancer: early detection and screening. Limited resource parameters with low health systems where most women are diagnosed in the late stages and should organize early diagnosis programs based on knowledge of the first signs and symptoms. Many methods are used to test women to identify cancer before all symptoms appear. Mammography is one of the methods in which an image of the breast used to detect and diagnose breast cancer tumors. Micro-calcification can be found in mammogram and it will indicate the presence of breast cancer. Preprocessing, feature extraction and classification are the three important steps to detect the micro calcification in mammogram. And there are different classifiers used for the classification of micro calcification. In this paper we analyze the performance of different classifiers and find out the best one for the classification using multi scale features.**

Keywords— Extreme learning machine, Gabor filter, K Nearest Neighbor, Mammography, Speed up robust feature

I. INTRODUCTION

Mammography is the low dose X-ray to view and detect changes in the breast tissue where the breasts are compressed between two X-ray plates and it is flat so as to have a complete view of all the areas of breast. A women's breast are composed of glandular tissue and ducts. Mammogram is used to detect breast cancer in women even if there is no sign of the cancer and this type of mammography is known as screening mammography. Screening mammograms consist of more than one X-ray images, or images of each breast. Screening mammogram can be performed in all women every one to two years after the age of 40. Mammograms are also used for tumor detection which cannot be felt. By screening mammogram it is possible to detect micro-calcification. If there is some signs are present then the breast cancer is detected by mammogram. This type of mammography is called a diagnostic mammography. [2][3].Diagnostic mammography is when the patient has additional mammography image above and beyond the routine views that are performed. One scenario is when an abnormality is seen on the screening study and the patient returns for additional views to further evaluate that finding. Another scenario is when the patient has s symptom like lump pain or nipple discharge related to their breast.

The radiation dose from the diagnostic mammography is higher and also it takes more time to perform the mammography because more breast images are used for getting the sinus view from different angles. The observer may develop a distrustful area to make a complete image for the doctors to make a decision.

Early detection of breast cancer improves the chances of women for better treatment. If the breast cancer is identified in its early stage then the survival rate can be increased. So it is necessary to do a regular screening procedure to detect breast cancer at proper time. However, studies conducted to date have not brought an advantage of regular screening mammography in women less than forty years of age or basic screening mammograms taken before the age of 40 years. And it has several disadvantages like false negative and false positive results [5][6].

False positive results occur if the mammogram shows abnormal but actually there is no cancer. The main problem of false positive result is that it will cause anxiety and other physiological distress to the affected women. And also it will leads to the further treatment procedures for the cancer and causes physical discomfort. False positive results are mostly found in women with age lass than forty, women who had previous breast cancer, women who have dense breasts and

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A Survey on LLC resonant converters with synchronous rectifier for EVs

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***Abstract*-This paper presents a literature survey on LLC resonant converters with synchronous rectifiers for electric vehicle battery charging.The topologies are taken by the literature survey from the earliest methods. Many controlling techniques have been surveyed.**

***Index Terms*—FHA, SR, simplified optimal trajectory control.**

I. Introduction

With the development of society and the increase in the living standards it is becoming very difficult to cope up with ever increasing price of fossil fuels. Development of a nation means better quality of facilities, which again requires energy. The fact that fossil fuels aren't going to last forever has forced mankind to think of other alternatives. Major environmental problems like global warming, environmental pollution, ozone layer depletion and have raised their attention to human as they greatly affect the climatic cycle. Thus in order to reduce the emission of greenhouse gases several governments around the world have been implementing various policies and schemes. Encouraging the use of Lead free petrol and electricity are among them. Transition from conventional means of transportation to electrified vehicles is necessitated by these factors. Continuous research in battery technology has been able to put it into a frequent use and also made batteries more economic.Recently battery technologies have been under research for the applications in electric vehicle. Thereby battery charging is critical for high density power charging.

Improving charge density, efficiency and decreasing the charging time had been the goals of battery researches. Also the DC-AC converters used for battery charging have been a constant area of interest for research.

This paper presents a literature survey on LLC resonant converters, which used in electric vehicle's battery charging process. The next section gives the literature survey on various converters used for electric vehicle's battery charging and the last section gives the conclusion.

II. Literature survey

The capability of an LLC resonant converter to operate in a wide input range and smaller switching losses makes them suitable to be used with the front end AC/DC converters. Figure 1 below shows the LLC resonant converter circuit.

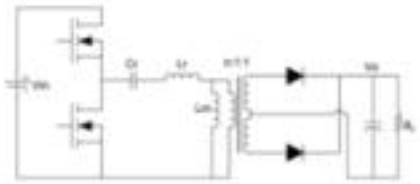

Fig1. LLC resonant converter

Most of the time it operates under normal condition, but as it has more steady voltage regulation it should always be operated in resonant condition. Complexity of the circuit and having no proper design methods limits its application. As in the conventional design for LLC resonant converters;as an alternative of justselecting 'Q' value, from the theoretical analysis of theLLC resonant circuit at the high gain and resonant frequency a relationship between the operating range and the switching losses can be acquired and using this relationship the circuit can be designed to have desired efficiency. In order to achieve minimum conduction loss both in the primary and secondary side, larger magnetizing

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A SurveyOn Hybrid Energy Storage System For EV With Regenerative Braking

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Abstract **- A HESS is successfully being used as energy storage system instead of using batteries alone . A HESS is able to bring together the characteristics of various storage systems thus yielding a strong storage system. Studies and analysis have proved that the most efficient HESS is the combination of a battery and a super capacitor. Several HESS topologies including the power electronic converter circuits are designed, implemented and analyzed for improving the vehicle's performance. The research for better control technologies for HESS for EVS including the RBS is an area of great interest nowadays. Various control techniques and strategies are being derived and analyzed for a more improved system performance. Regenerative braking applied in electric vehicle allows recycling the brakingenergy,this isn't applicable in the conventional internal combustion vehicles. In regenerative braking process, the energy from the motor is fed back to the battery, as the vehicle's inertia makes the motor to operate in generating mode. Regenerative braking improves the efficiency of energy utilization and prolongs the life of the electric vehicle. This survey is conducted in order to get a detail picture of recent advancements in EVs, their energy storage systems, controlling methods and about the regenerative braking which improves the efficiency of the system.**

Keywords: HESS(hybrid energy storage system), RB(regenerative braking), EV (electric vehicle)

I. INTRODUCTION

The battery technologies have limitations of accepting the charging currents which are reported to be lower compared to discharge current. Thus, the energy recovered during regenerative braking is limited.Therefore, the auxiliary system like super-capacitor coupled with battery has considerable advantages on the charge acceptance and life. The fast charging is possible with high currents and greater cycle life time as compared to batteries. But, super-capacitors have lower energy density as compared to the batteries.Battery alone as an energy storage system in EV can regenerate power around 20% of brake energy during regenerative braking.

Thus an appropriate way in fulfilling the requirement of an electric vehicle is by making use of a hybrid type of energy storage system. The hybrid energy storage system topology is shown in the figure 1.1below.

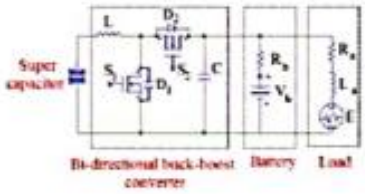

Fig. 1.1: Basic HESS for EV

In this circuit, battery is connected directly to the load and the super-capacitor is also connected to the load through a bi-directional buck-boost converter. The performance of the hybrid electric vehicles were analyzed in differentenvironment modes of operation such as acceleration mode, cruising mode (electric vehicle in moderate speed), and regenerative braking mode [1].

The HESS for electric vehicle comprising of a battery and a super capacitor is analyzed here. A Buck converter is placed in between super capacitor and battery to control the power flow from super capacitor. A diode is placed between super capacitor and diode such that they are parallel connected and it is in reversed biased condition, preventing the flow of energy from super capacitor to load during normal mode of operation.In the circuit shown above the harvest of regenerative braking is improved by the elimination in the number of converters utilized for this purpose. The braking energy harvested is utilized to charge the battery so as to keep the battery pack from deep discharging during driving uphill and also to improve the vehicle's acceleration[2].Without exceeding the safety limit of the battery current, the power capacity can be greater than that of the passive hybrid.Recent studies on hybrid energy sources prove that the combination of ultra-capacitors and

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KY Based DC-DC Converter for Standalone Photovoltaic Water Pumping System Employing Four Switch BLDC Drive

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***Abstract*—Solar based water pumping system is getting a broad consideration, since solar energy is found to be the best solution for the existing conventional energy resources. Moreover solar PV (Photovoltaic) fed water pumping is favored technique within the remote regions for different applications. In this paper KY based DC-DC converter fed water pumping system with BLDC (Brushless DC motor) is proposed. Voltage ripple reduction is one of the main advantages of KY converter with a high transient response. For tracking the maximum power under various irradiation conditions P & O Perturb and Observe) based MPPT (Maximum Power Point Technique) technique is employed by varying the duty ratio of KY converter. Instead of six switch VSI (Voltage Source Inverter), four switch VSI is employed, where cost saving is accomplished by decreasing the number of inverter power switches. A BLDC motor is connected to drive the centrifugal pump, since it has advantageous feature while connecting to that of PV generator.**

***Keywords*—KY Converter, Four switch VSI, BLDC motor, MPPT**

I. Introduction

SPV (Solar Photovoltaic) based projects are considered now, due to the reduction of cost of solar panels as well as the electronic devices. Water pumping using SPV received wide demand because of its vital and affordable nature of power generation. MPPT technique is employed in most of the PV based applications [1]. From the different traditional methods of MPPT, P&O MPPT is considered better, where it captures the maximum power under various conditions. Most common type of DC-DC converter used for SPV and MPPT application is the BOOST converter [2]. Conventional inductor-based boost converter produces high - voltage ripple pulsating current in output. As a result, large power losses will also have occurred. A recent study focuses on the design of a KY converter, possessing fast transient response, less voltage reduction etc [3].

The efficiency of the energy conversion in the solar energy system will be high only at certain voltage and current conditions at which the power will be a maximum. This operating point is called Maximum Power Point (MPP). In this project, the KY converter is controlled by Perturb and Observe (P & O) algorithm to track MPP at any irradiance condition [4]. The purpose of this paper work is to develop PV array fed BLDC drive employing KY converter to boost the PV array voltage and four switches inverter for conversion of DC supply to AC supply required for BLDC motor. In the proposed BLDC drive, the number of switches in the 3-phase inverter is reduced from six to four which results in great saving in hardware cost and reducing the size of hardware.The performances of the proposed system is analyzed through the simulated results using MATLAB/Simulink environment.

II Proposed System

A new PV array fed BLDC drive has been developed in order to harness renewable energy source and to reduce the load demand of EB supply. The system consists of KY Converter fed by PV array to make the DC voltage of PV panel to the desired value for inverter and four switch inverter to generate variable frequency and variable voltage AC supply.

III Operation Of Proposed System

The block diagram of the PV fed BLDC motor drive employing KY converter for PV array MPPT and four switches inverter for BLDC motor is shown in Figure 1[5]. The KY converter will buck or boost the DC voltage output of solar panel in order to provide the required DC voltage for BLDC motor [6]. The duty cycle for PWM pulses of KY converter will be determined by P&O MPPT algorithm. P&O algorithm is also termed as hill climbing, where both the name indicates that the, providing certain perturbations, it captures the maximum power by increasing or decreasing the voltage. The four switch three phase inverter will generate the required variable voltage and variable frequency supply for BLDC motor [7][8]. The ON or OFF pulses for the power switches of inverter are determined from the signals obtained from Hall sensors. The speed feedback helps to achieve closed loop operation.

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Optimal Tuning Of PID Controller For Switched Reluctance Motor Speed Control Using Particle Swarm Optimization

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***Abstract*-This paper describes the Design of controllers for Switched Reluctance Motor using technique such as Particle Swarm Optimization. Conventional PID controller is nowadays used in most Engineering being acknowledged its ability to give up a superior control in power electronic system. The purpose of this work is to design a speed controller for the motor to achieve minimum time domain integral squared error. This work concentrates mainly on the design of feedback PID controller to achieve the minimum integral squared error and hence the controller parameters k_p, k_i, and k_d are identified. It can be done through PSO Algorithm. The model of a converter works along with the algorithm which results with a robust feedback PID controller was developed using MATLAB/SIMULINK software.**

***Index Terms*-Active boost converter, Switched Reluctance Motor, PID controller, Particle Swarm Optimization Algorithm**

I. INTRODUCTION

Nowadays the SRM has unique features like simple structure, high efficiency, economic, controlling is flexible, and high torque at the starting in very high speed ranges [1]-[3]. Even though it has good features it has extreme multi-variable, nonlinear coupling and ripples in torque due to the special features in the SRM [4, 5]. For ideal speed control of Awitched Reluctance Motor, the traditional PID controller is not enough and many scholars are carrying out researches to have efficient speed control. By using a microprocessor the four quadrant control is possible in SRM [6]. Based on fuzzy logic, a high efficient speed controlling of SRM is used, but the control of current is not done [8]. In order to have the speed control of SRM in a cascaded configuration two fuzzy controllers are used [9]. In [10], in order to obtain optimized control a new technique was introduced where fuzzy and PI controller is used. A self-tuning technique for fuzzy and PID is used for speed controlling in SRM drive system [11].

II. MATHEMATICAL MODELLING OF SWITCHED RELUCTANCE MOTOR

The feature of poles are found in the rotor as well as the stator of SRM but field windings are present only on the stator. The rotor of SRM is made up of laminated silicon steel. The converter phase provides supply to the stator poles which is in opposite side. The converter phase current is kept on and off which is always synchronized to the rotor position. SRM always obey the principle of minimum reluctance. Initially the stator windings are got energized, this will generate magnetic field, which results in reluctance torque and thereby the rotor will have the tendency to go to position where it has minimum reluctance.

The k^{th} phase equation for SRM is given as:

$$u_k = R_k i_k + \frac{d\psi_k(\theta,i)}{dt} \qquad (1)$$

Here R_k and u_k represents the resistance and voltage respectively. The ψ_k and K_i represents and flux linkage and current respectively. θ corresponds to the angle position of current rotor. The $\psi(\theta,i)$ which is the flux linkage, it is a function of rotor angle position and the current and the angle position of the rotor, this can be expressed as

$$\psi(i,0) = L(i,0)i \qquad (2)$$

Here $L(i,0)$ represents the stator phase inductance.

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A Survey On Optimal Tuning Of PID Controller For Buck-Boost converter Using Cuckoo-Search Algorithm

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***Abstract*- The concept of global warming has become a very big issue due to the rise in the level of consumption of energy. So the increased efficiency rate of consumption of energy is an inevitable factor in our modern society. Many applications is in need of a high efficient system. So inorder to attain high efficiency, commonly dc–dc converters are being used. This paper reveals the study of various dc-dc converters and the controllers which is used to control the dc-dc converters for efficient applications. Among the different dc-dc converters, the buck–boost converter is special because it has both step-up and step-down modes. So a study of various buck-boost converters was carried out and the simplest and most efficient with fewer losses was found. A survey on various control technique that can be used for efficient control of the buck-boost converter was done. PID controller technique was deeply studied and different tuning algorithms was analyzed. These algorithms was compared with each other by considering their performance and optimization ability in limited time period.**

Index Terms*-Buck-boost converter, PID controller, Cuckoo-Search Algorithm

I. INTRODUCTION

We all know that the energy consumption is increasing day by day which will lead to increased level of global warming issues. It is very difficult to decrease the level of consumption, so to have a sufficient energy life the only way is to increase the efficiency of the energy consumption. Many applications require high efficient systems. In order to achieve high efficiency dc-dc converters are commonly used, among them the buck-boost converter is more suitable as it has all the three modes. The most important thing in the design of power system is to provide high quality of power and it should be always uninterrupted. Moreover while considering the complex networks and sever interconnected systems it should be capable of avoiding blackouts. The main aim of the controlling strategy is to produce and distribute power in a more economical way and make it reliable. Even though they are taking care of all these things, the main concern is to maintain the voltage and the frequency within the allowable limits. This paper presents a review on various buck-boost converters and then control techniques for the proper working of the power converter. This paper also suggests tuning algorithm for the efficient tuning of the controller by considering their performance in accordance with the comparison with the other algorithms.

II. LITERATURE REVIEW

Different topologies were introduced for buck-boost converter in order to have an improvement in the efficiency. One of the best examples is a buck-boost converter with low voltage stress and reduced conducting components. It is different from the normal buck-boost converter.

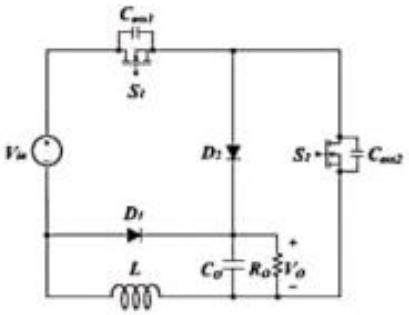

Fig.1 Converter with low voltage stress and reduced conducting components

In this introduced converter the voltage stress experienced by the semiconductors is very less when compared to the conventional. When considering the case of active and passive components in the circuit, both the normal and the proposed converters have the same number. But the conducting components are less in the proposed thereby reducing the

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Soft Computing Based MPPT Controller for Solar Powered Battery Charger Under Partial Shading Conditions

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Abstract **: Solar irradiations received by the PV panel is blocked by a moving or non-moving object is known as partial shading condition. The solar panel power output under partial shaded will be a maximum only if the panel voltage is maintained at the Global Maximum Power Point. The GMPP can be determined from the Power-Voltage characteristics of the partially shaded solar panel and this voltage is called optimum voltage. The battery charging may require a voltage different from the optimum voltage. Therefore, a GMPPT Global Maximum Power Point Tracking CUK converter is employed that maintains partially shaded solar panel voltage at optimum value and buck or boost the solar panel voltage to a value required for battery charging. The objective of this work is to develop solar based battery charger using CUK converter with Maximum Power Point Tracking under partial shaded condition by Grey Wolf Optimization algorithm The simulation of the partially shaded solar panel fed CUK converter for battery charging applications is performed in MATLAB - SIMULINK. The CUK converter in the battery charging system is basically a buck-boost converter that employs a single power switch. Duty cycle of gate pulse to power switch decides the power drawn from partially shaded solar panel. Therefore, the duty cycle is determined for GMPPT using Grey Wolf Optimization algorithm which can track the GMPP very fast for fast changing irradiances. The simulation is performed for charging 5.8 AH, 48 V Lithium-Ion batteries.**

Keywords — Maximum Power Point Tracking (MPPT); Partial Shading Condition (PSC); Global Maximum Power Point(GMPPT); Grey Wolf Optimization(GWO); Photovoltaic (PV)

I. Introduction

The need for non conventional and clean sources of energy is increasing throughout the world. With increasing popularity of solar systems, there is always an eminent need in making efficient the PV system. The efficiency of the energy conversion in the solar energy system will be high only at certain voltage and current conditions at which the power will be a maximum. Hence the operating point is called maximum power point. It is found non-linear for power-voltage curve of a PV panel and thereby it also depends sunlight irradiance and temperature f the atmosphere .The variation in voltage and power due to temperature is less significant when compared to sunlight irradiance[1]. Since the sunlight irradiance is not constant throughout the day, the power output of a PV panel will also not constant. Besides, the MPP will also shift with change in sunlight irradiance and atmospheric temperature[2]. MPPT technique is to be used for achieve maximum power under different temperature and irradiance. Another major problem associated with solar power generation is handling Partial Shading Condition (PSC) due to passing clouds[3]. Under partial shading condition, the P-V characteristics has multiple power peaks (global and local maxima). The ordinary MPPT techniques are fail to search the Global Maximum Power Point under partial shading condition [4].Therefore the soft computing methods are used to determine the global power peak by deciding the best duty value for the CUK converter to remove greatest power from PV array under shading condition[5].

In this paper, the partially shaded PV panel is implemented by connecting the solar panel in series configuration and setting irradiance level of each panel at different values and connected via CUK converter for Lithium-Ion battery charging with GMPPT by using Grey Wolf Optimization (GWO) algorithm.

II. Proposed System

The block diagram of PSC PV fed CUK converter based battery charging system with Grey Wolf optimization technique is presented in Figure 1. The proposed PV system consists of four PV panels in series with various irradiations to realize PSC, CUK converter and Lithium-Ion battery. In this project GWO technique is used to determine the best PWM duty for the CUK converter to track GMPP under Partial shading condition.

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Wavelet Modulated Inverter for WECS using Permanent Magnet Synchronous Generator

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Abstract— **In this paper, a better control techniques known as wavelet modulation is proposed at the inverter side of wind energy conversion system. Permanent magnet synchronous generator is one of the generator used for integration of wind energy into power electronic topologies due to its simple construction & it provide direct coupling & number of poles can be change easily. A back to back converter topology is the most commonly used one, consist of rectifier on rotor side and inverter on grid side. Several modulation techniques are there for the control of inverter connected to load side in a wind energy conversion system. Switching pulses for inverter is generated using dSPACE1104 controller. The overall system is modelled and performance is verified in MATLAB Simulink & in hardware and obtained Low harmonic content and magnitude of fundamental component is high as compared to conventional techniques.**

Keywords—Wind energy conversion system (WECS), Total harmonic distortion (THD), Wavelet modulation (WM).

I. INTRODUCTION

As the wind power generation has been increasing day by day, it is important to design and select proper generator and converters for WECS. Various types of generators and power electronic topologies are used for integration of wind energy to grid or isolated load. Squirrel cage induction generator is a simple, small size, low cost machine having stable performance, but it is a geared turbine with fixed speed [1]. In a doubly fed induction generator stator is directly connected to grid and rotor is connected to load side using rotor side converter and grid side converter. Active and reactive power can be effectively controlled using this system [2]. But it is a geared system having brush and slip rings, hence entire cost of the system and failure rate is high [3]. Permanent Magnet Synchronous Generator (PMSG) does not have brush, slip ring and gear box [4]-[5]. It is simple in structure and can be directly connected to wind turbine. Stator of generator is connected to load using rotor side converter and load side converter [6]. Better control techniques are needed to reduce harmonic distortion in the output side of inverters.

Pulse width modulation (PWM) is the most widely used techniques for the control of inverter, by increasing switching frequency, THD decreases, however this increases the switching losses [7]. Third harmonic injection technique adds third harmonic to each phase of a three phase inverter. This technique provide inverter output voltage as sinusoidal, approximately same as that of AC supply. But it does not provide any information about the amount of third harmonics to be injected [8]. Space vector modulation and selective harmonic elimination are the alternative concepts. In space vector modulation space vector concept is used for the computation of duty cycle of the switches [9]. Opposite harmonic elimination is the technique used in selective harmonic elimination [10]. Both these are very difficult to implement [11].

In this paper a new techniques, known as Wavelet Modulation scheme is applied to inverter of a WECS. . It's a sample based techniques [12]-[15]. Wavelet is like a wave that first begin to zero and reaches to maximum amplitude and decreases to zero amplitude again. The overall system is modelled and performance is verified using simulation & hardware results.

II. PROPOSED WECS WITH WAVELET MODULATED INVERTER

The proposed system consists of a wind turbine coupled to a PMSG, a diode rectifier used at the machine side and a wavelet modulated inverter used at the load side which gives a high quality voltage at the output. Fig.1 shows the circuit diagram of proposed wind energy conversion system.

A. Wavelet Modulation Scheme [12]

Wavelet modulation is a sampling based technique can be done by creating two time instants at first. These time instants are boundaries of rectangular pulses and these are interpolated into rectangular pulses in the second step. The sampling instant

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Multilayer analysis for prediction of Power tracing on Uncertain Loads

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Abstract - **The techno-socio economic considerations have triggered the installation of more renewable energy sources to the grid. Most of the renewable energy systems are connected to the grid in a distributed manner. The output of the renewable energy sources like wind, solar and tidal energies are highly unpredictable in nature as the sources of energy considerably depend on natural conditions. The add of effect of such these disturbances will affect the quality of the grid and is more serious in microgrids. The fluctuating demand and the uncertainty in the generation will affect the direction of the power flow from node to node. This paper focus on a multilayer machine learning procedure for identifying dissociative behaviour of a grid at various nodes, methods to effectively schedule and predict the power flow between the nodes, thus by identify the islanding.**

Keywords: Microgrid, Machine learning, Renewable energy, Prediction, Power flow.

I. INTRODUCTION

A major fraction of demand response in microgrids is accommodated with distributed renewable energy sources which include photovoltaic systems, wind energy systems and fuel generators as primary sources of energy [1]. The tidal, wind and hydro power generation systems are located regionally in nature which will be affected by transmission losses before reaching the consumer [2]. Output of a wind turbine largely depends on air density, effective rotor swept area, wind speed etc and the output of a photovoltaic cell depends on effective swept area of solar radiation, the yield intensity based on the frequency spectrum, average solar radiation linked to the cell etc. These factors depend on area, region, season, atmospheric conditions, environmental factors, weather conditions etc [3]. Every stated factor is uncertain, unpredictable and unreliable to a great extent, and hence the output of such renewable energy sources is highly fluctuating or disturbing [4].

Disturbances can be classified as dependent or independent, discrete or continuous, correlated or uncorrelated, static or dynamic steady state or transient, symmetrical and unsymmetrical, independent or accumulated [5]. Continuous or unsymmetrical or accumulated false are dangerous in nature to a microgrid which creates added complications other than that of its kind. Derivations in the operation parameters will create the disturbances in the magnitude of the power as well as voltage, Current, frequency [6].

For the economic mode of operation, most of the microgrids are operated in near loading limit and renewable energy sources are integrated to the bus nodes to meet the demand [7]. The power flow between the nodes is bilateral in nature which depends on a number of parameters suppliers generating capacity, load demand, transmission losses, economic factors, social concerns, domain priority and stability concerns. If there are more than two generating nodes, the bilateral transmissions also depend on the behaviour of adjacent nodes and state of power flows between adjacent node points [8].

Scheduling the power flow by considering the social, economic, technical and operating behaviour of the individual elements off the grid even under uncertain generating capacity and user behaviour is a complex task [9]. If the negative tracing level is beyond a certain limit, system will fall under islanding [10]

This paper has three parts; the initial section focus on the parameters affects the power tracing, the second part on the methods to identify the power tracing and the third part on the implementation and analysis of the method [11]. Identification method has two layers, the primary level focus on the production of initial values of nodes for determining the power tracing using regression and the second layer focus on determination of power flow each node point [12].

II. POWER TRACING ANALYSIS

Power load tracing is determined by taken into account of a number of factors such as social constraints, economical compulsions, technical motivations and safety concerns [13]. The contact and co-variant effect of all these factors are considered and each node point is analysed for the possible scheduling. The steps for determining the power tracing includes:

1. The nodes with the status of overloading are identified.
2. Generating nodes and magnitude of energy produced in a node is identified. If there is a scarcity of generating nodes, microgrid is connected to main grid [15].
3. If the on-grid model is not available, the possible options for load scheduling or load shedding are taken. If there is excess of energy produced from the sources, a fraction of the

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DATA ACQUISITION AND CONTROL OF MULTIPLE STATIONS USING HMI AND NI USB-6212

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*Abstract:***This paper deals with the computer based realtime control of process stations using PI, PID & MRAC controllers. The specific problem is system identification for level and flow stations.The transfer function of the system is obtained from the openloop testing, and based on the parameters obtained the controllers are vdeveloped. By the closed loop method the PI, PID controllers parameters are also obtained and the simulation is carried out in MATLAB . The real time implementation is done by labVIEW with the help of PC and DAQ card and both results are compared.The Model reference adaptive controller (MRAC) is also developed and implemented in realtime and the response is compared with conventional controllers PI & PID for the combined level & flow process.**

Key words: MATLAB, PIController, PIDController MRAC,NIDAQ card,System Identification

I. INTRODUCTION

An automatic control is accomplished by sensing the water flow and then controlling the position of a control valve that control the flow of water through a pipe. The flow project execution is: An orifice plate is fitted in the water flow line that produces differential pressure with respect to the flow. This differential pressure converted into 4-20 mA range using a flow transmitter, then it transmits into the DAQ card. The designed controller will be generating the necessary controlling signal with respect to the flow sensor output. The controlling signal will be acquired by DAQ card. The DAQ card transfers it to the I/P converter which will transfer the electrical pulses 4-20mA into pneumatic signal 3-15psig to actuate the control valve. On the same way the level process also is a Multi-loop Trainer set up mounted to a tank whose level has to be controlled using a feedback control loop. The level process execution is: The measured inputs to the designed PI, PID & MRAC will be provided by Level transmitter. The designed PI, PID &MRAC will be generating the necessary controlling electronic signal. This signal will be acquired by DAQ card. The DAQ card transfers it to the I / P converter which will convert the electrical pulses 4-20mA into pneumatic signal 3- 15psig to actuate the control valve. By virtual controller's implementation, we are getting the freedom of reconfiguration and flexibility of the control strategy. After that, the level and flow station combined together by DAQ and controlled by a single PC with the help of LabVIEW software implementation.

The primary aim of this paper is to implement Virtual & real-time instrumentation controllers for flow and level process station. This Virtual & real time Instrumentation using PI, PID & MRAC controllers implementation are possible by the Virtual Instrumentation software LabVIEW developed by National Instruments. We have used a Data Acquisition board (DAQ) for interfacing with the hardware and controlling by single PC. This DAQ card is product of the similar company NationalInstruments

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Recent Developments in Control of Car like Robot using MP-MPC

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Abstract: *A car like robot, path tracking is a problem of practical importance in the field of robotics and autonomous vehicles. The aim is to have a mobile robot follow a given reference path autonomously. The Model Predictive Controller (MPC) is a controller which anticipates control input depending on system current states. The Prediction and Control Horizon depends on the states of the system. So, for high speed applications more storage space of the computed states may arise, which intern results to large computational time of Model Predictive Controller. To resolve this problem an Explicit Model Predictive Controller is implemented. Solicitation of MPC regulators with short on-line computationalmandate and firm sampling by varying the affliction of optimization to the off-line controller design phase is guaranteed by Multi Parametric Model Predictive Control (MP-MPC).*

Keywords: Car like Robot, Explicit MPC, Predictive Control

I. INTRODUCTION

A car likerobot, path tracking is a problem of practical importance in the field of robotics and autonomous vehicles. The aim is to have a mobile robot follow a given reference path autonomously. Introduction of modern technologies such as power steering, antilock braking and traction control has helped to reduce the accentuation of the drivers. Present scenario in the world of automobile is complete automation of vehicle. To gain trust on fully automated vehicles we need promising technology which can guarantee fast and a safe journey. The same similar situation arises in the case of car like robot. While taking the system for an application the parameters such as velocity, time are of prime concerns. The increasing velocity increases the vulnerability to slip and roll over depending on the dynamics and condition of the environment. In this scenario it is necessary to design a controller that continuously takes the action on the system. The Model Predictive Controller (MPC) is a controller which anticipates control input depending on system current states. The Prediction and Control Horizon depends on the states of the system. So, for high speed applications more storage space of the computed states may arise, which intern results to large computational time of Model Predictive Controller. To resolve this problem an Explicit Since the lateral dynamic model of the system is considered for the ease of computation the bicycle model of the system is also done. To achieve the fast and secure traction of automated vehicle, prediction is imminent. Computational complexity of conventional MPC can be overcome by using Multi Parametric Model Predictive Control successfully.

II. CLMR SYSTEM

The same similar situation as in vehicle arises in the case of car like robot .A car likerobot; path tracking is a problem of practical importance in the field of robotics and autonomous vehicles. The aim is to have a mobile robot follow a given reference path autonomously. While taking the system for an application the parameters such as velocity, time are of prime concerns. The increasing velocity increases the vulnerability to slip and roll over depending on the dynamics and condition of the environment. In this scenario it is necessary to design a controller that continuously takes the action on the system. Most important skill of a driver is his ability to simulate the vehicle in advance, before applying controls. This demands a predictive control in vehicle automation which can naturally consider constraints in calculating control action.

Model Predictive Control (MPC) is a multivariable control strategy which can naturally takeinto account physical limitation of controlled plant. It is a mathematical method which usessystem model to predict its evolution and thus can be able to compute optimal control action. In MPC at each sampling time optimal control problem often for finite horizon (usuallyformulated via Quadratic Programming (QP)) parameterized by current state measurement estimation is solved. The solution, current control actions for inputs is then applied tothe plant.MPC

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Control Analysis of Magnetic Levitation System

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***Abstract*- Control system possesses lot of research effort towards the control of a Magnetic Levitation System (MLS). The control of MLS has the extensive scientific interest because of the highly nonlinear and unstable features thus make the modeling and control problems very challenging. The system eliminates friction, generates high-precision positioning and lessens maintenance cost. These merits make the system a good choice for applications like high-speed trains, magnetic bearings wind tunnel levitation and vibration isolation systems, etc. Several dynamic models of the system have been proposed and for these models various control strategies have been used and comparing their performance. This paper generates the methods of control technologies implemented on the magnetic levitation system.**

***Index Terms*- Magnetic Levitation System (MLS), Fuzzy Neural Network, Back stepping algorithm, Adaptive controller**

I. INTRODUCTION

The Magnetic Levitation System is one of the most important laboratory models for understanding of control systems. Though the system is very simple and easy to understand, both classical and modern design and control strategies can be used as the control techniques. The system is method by which a ferromagnetic object is suspended without any physical support by the magnetic fields. The magnetic pressure provides an acceleration against the effects of the gravitational force. For the operation of magnetic levitation it has to be change the strength of a magnetic field by any change in the magnitude of current. If there is a need of more force, then sending more current through a coil of wires will produce greater magnitude of magnetic force.

The magnetic levitation has two basic principles. The first law is Faraday's Law, which states that if there is any alter in the magnetic field generated by the loop of wire; tend to produce a change in voltage. The Law of Heinrich Lenz gives direction of the forces created by Faraday's law, states that "The emf induced in the circuit always acts in the direction of current flows through circuit which opposes the change in the magnetic flux ,produces the emf". The system has highly nonlinearity and instability [1]. Thus the control of the systems has a considerable scientific interest. The system reduces friction, less maintenance cost, and provides high-precision positioning [2], [3]. These advantages make magnetic levitation systems used for high-speed trains, vibration isolation systems, magnetic bearings, and wind tunnel levitation [2], [4], [5].

Plentiful control solutions are proposed for the systems, like feedback linearization techniques, which need a very accurate model, thus represent a major problem that an exact dynamic is difficult to get [2], because of the inbuilt nonlinearities and variation of the gain of the system due to variation of distance between magnet and ferromagnetic object. Other control method are based on the dynamic model is liberalized and controlled at nominal operating points. Different controllers introduced for the levitation systems are sliding mode, nonlinear, PID, back stepping, and fuzzy neural network controllers etc have been proposed, provides more accuracy and robustness against nonlinearities present in the system.

II. Control Techniques

The objective of the literature survey regarding to the design and implementation of various control system for magnetic levitation system. Different controllers are introduced for the system in order to have an improved and controlled performance.

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Survey on Different Control Schemes for Distillation Columns

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***Abstract*: Distillation column is the widely used important parting technique in petrochemical industries, where purity of components plays an important role. Modeling of distillation column and control is considered to be an intricate task because the plant behavior is usually non linear and highly interactive. So a study of various control schemes was carried out. A survey on various control techniques that can be used for efficient control of the Distillation column was done. Several control techniques were deeply studied and analyzed. Also compared with each other, by considering their performance on the basis of parameters like settling time, overshoot etc.**

***Keywords*: Distillation column, MIMO systems, Multi-loop controller, FMPC, LMRC**

I. INTRODUCTION

Distillation columns constitute an important role in most of the petro-chemical engineering plants. It is the most vital parting or purifying technique in chemical process industries across the globe.

In industries reduction in energy consumption and enhancement in quality of products can be achieved by maintaining proper distillation control. However, both distillation column modeling and control are difficult task because the plant behavior is usually highly nonlinear, non stationary, interactive, and is subject to constraints and disturbances.

The distillation process includes a number of systems as shown in fig. 1 including a column consisting of a number of trays, a condensed, reboiler reflux drum etc. The mixture, which is to be separated from its constituents, is fed through the mid-section of the column. The separation of constituents depends on its boiling points. The column is divided into two regions the enriching section, in which concentration of gaseous components will be higher and stripping section in which the concentration of liquid is more. Main aim of most of distillation control is to maintain the distillate composition.

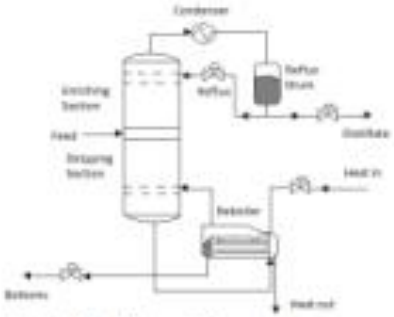

Fig. 1. Distillation Column

Between the trays, a huge amount of heat transfer occurs in the distillation column. Thus, emerges the need of suitable design and control for an energy efficient process, to get the top and the bottom products of desired quality and the whole process inside the distillation column being more economic. Various control strategies have been designed and are being used for controlling the distillation process to maintain the composition of top and the intermediate products. In this paper, modeling techniques and different effective control schemes for distillation column is discussed.

II. LITERATURE REVIEW

As the complexity of the system increases the demand for the control strategies also increases. Being a multivariable system, distillation column poses substantial effects of coupling or interaction on the control action. Interactions and the troubles caused by them are always considered while the designing of multi-variable control systems for distillation column. In industries, most of the columns are controlled by SISO controllers and normally only one single composition is routinely

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Control Schemes For a Nonlinear Conical tank System

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Abstract*— Controlling of level in conical tank nonlinear process is frantic because of its shape. In most of the industries the flow and level control plays a essential role. Controlling of altitude is a difficult process conical tank because of constantly varying section with height and its nonlinearity.So study of various control schemes was carried out. A survey on various control technique that can be used for efficient control of the level in the conical system was done. Control techniques were deeply studied and analyzed. Also compared with each other, by considering their performance on the basis of parameters like settling time, overshoot etc.

Keywords: Conical tank system, Fuzzy Logic Controller, PID controller,IMC etc.

I .INTRODUCTION

In chemical industries, major assignment of controller is to defeat different conflict to create the process to stay in steady situation. In every tank system, outline plays a essential role for conniving the controllers.A conical tank system is considered since it has the following advantages like improved clearance of hard materials, simple addition,waste water treatmeant and absolute drainage of materials that is gelatinous liquid in industry. Based on non-linearity the controller has been selected. Non-linearity of conical tank exist due to the variation in its area. Conical tank is a tricky task to control the Level and stress for completion in real time. Conical tank is a highly nonlinear system. It is widely used in chemical plants because of its easy ejection of materials and it has very strong structure.The nonlinearity occurs in its shape with respect to altitude of the tank system.Small surface area per unit volume is the main advantage of conical tank storage. Already several controllers are implemented to manage the nonlinearity of the non-linear conical tank.

It describes the modeling techniques and different effective control schemes for conical tank is discussed.

II.LITERATURE REVIEW

Different controllers are introduced for Conical Tank System to have an improved and controlled performance.As the complexity of the system increases the demand for the control strategies also increases.To overcome these difficulties, several researches are conducted from the time being and still going. From conventional controllers to advanced controllers, their performance on conical system is improving along with these researches.

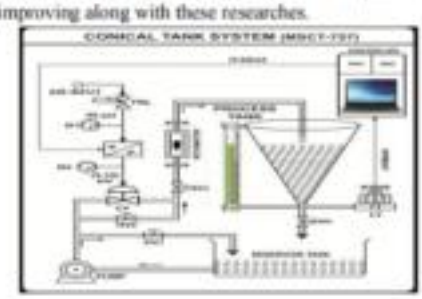

Fig 1: Block diagram of process

Liquid level process of a conical tank system is designed using Model Reference Direct Inverse

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