K.L.N. COLLEGE OF ENGINEERING, POTTAPALAYAM
Department of Electrical and Electronics Engineering

Project Work Details 2013-2014

Subject Code & Name : 10133EE804 – Project Work
Year/Semester : IV/ VIII

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Title of the Project

OPTIMAL CAPACITOR ALLOCATION IN RDF USING EVOLUTIONARY ALGORITHMS FOR LOSS MINIMIZATION

Project Members

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ABSTRACT

This project focuses on the planning method for capacitor installation in a distribution system to reduce the installation costs and minimize the loss of electrical energy. Among the distribution systems, radial distribution systems are popularly used because of low cost and simple design. In radial distribution systems, the voltages at buses reduce when moved away from the substation, also the losses are high. The benefit of placing capacitor in radial distribution feeder system is to reduce its electrical loss and voltage profile improvement.

The location of the capacitors to be placed in the 34 bus system is determined by the Fuzzy Expert System and the sizing of the capacitor is decided by the objective function. The optimization techniques Particle Swarm Optimization (PSO) and Ant Colony Optimization (ACO) are used to optimize the cost associated with the placement of capacitors and maximize the annual savings of the associated power systems. The applicability of the algorithms is studied with the help of IEEE 34 - bus radial distribution feeder systems.

Title of the Project

CURRENT SOURCE INVERTER BASED PHOTOVOLTAIC SYSTEM FOR GRID CONNECTION

Project Members

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ABSTRACT

The main aim of this project is to develop a photovoltaic system for grid connection using current source inverter. The photovoltaic system is considered to be a most promising technology, because of its suitability in various aspects such as distributed generation, satellite systems, transportation and to overcome present energy crisis & environmental issues.

The proposed system utilizes transformer-less single-stage conversion for tracking the maximum power point and interfacing the photovoltaic array to the grid. To improve the power quality and system efficiency, a double-tuned parallel resonant circuit is proposed to attenuate the second- and fourth- order harmonics at the inverter dc side. With the help of voltage boosting capability of current source inverter, we can achieve high voltage which allows a low-voltage PV array to be grid interface without the need of a transformer or an additional boost stage.

The proposed system is simulated using MATLAB software package and a hardware prototype of the proposed system is developed with a low-level rating photovoltaic system.

Title of the Project

LOAD CURTAILMENT IN RESTRUCTURED POWER SYSTEM USING PSO AND GA

Project Members

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ABSTRACT

In a deregulated electricity market, congestion problem means the producer and the customer of electric energy desire to produce and consume the electric energy in amount that would cause the transmission system to operate at or beyond their transfer limit. Congestion management is one of the key function of a system operator that involves relieving of congestion and reducing the cost in finding the optimal solution. Load curtailment is one of the optimal methods in which a temporary power load reduction is done to relief the congestion. Optimal rescheduling of generators leads to generation operation at an equilibrium point away from the one determined by equal incremental costs while managing congestion. For rescheduling of generators, two different types of algorithm are used. Particle swarm optimization (PSO) technique, motivated by behavior of organisms such as fish schooling and bird flocking and also a global optimization technique known as genetic algorithm (GA) has also emerged, which is based on the principles of genetics and natural selection. Thus in this project, a comparison is made between these two algorithms based on the severity of congestion.

Title of the Project

ERROR PROOFING IN HYDRAULIC PRESS MACHINE FOR WRONG BUSH ORIENTATION

Project Members

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ABSTRACT

This project report is mainly focused on the Connecting rod line for improving the proper orientation of bush with two oil ways (OL1 and OL2) into the smaller end of Connecting rod provided with two oil ways using HYDRAULIC PRESS MACHINE. The process towards our final proposal in the HYDRAULIC PRESS MACHINE was started with the thorough study of process in the electrical control circuit and the hydraulic control circuit along with the design of the fixture. The major problem occurred was due to manual error in placing the bush into the main bunk provided with a ball bearing and a hole for proper orientation of bush into the small end of connecting rod. In order to reduce the manual error, we have made use of an ARDUINO Integrated development environment (IDE) with ATMEGA 328 microcontroller, LM 358 op-amp, and Darlington pair phototransistor L14F1. The error proofing in the Hydraulic press machine for orienting the bush properly into the connecting rod was successfully tested using the above mentioned electronic devices and were able to control the down ward movement of the RAM used to press the bush into the connecting rod in case of proper and improper orientation of the bush in the bunk provided in the fixture. The error proofing in Hydraulic press machine was improved and it had a significant impact in the reduction of scrap in conrod production.

Title of the Project

MAXIMUM ALLOWABLE LOAD CALCULATION USING DIFFERENTIAL EVOLUTION AND ARTIFICIAL BEE COLONY ALGORITHM

Project Members

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ABSTRACT

Nowadays, power demand is the major concern in the electricity market. In order to satisfy that power demand, we must develop the generation capability and loadability of the load buses. However, increase in the number of generating units, will be costly measure to meet this growing demand. And also by improving loadability of load buses, these power demand can be met in a cheap manner. Thus to determine the maximum allowable load at the particular bus without violating bus voltages, we use Differential Evolution and Artificial Bee Colony algorithm. In our project, Real –reactive power and voltage constraints are checked in order to ensure the stability maintenance of the Bus system. Thereby, we compare the results of the two optimization algorithm by providing statistical analysis. Here, IEEE 30 Bus system is used as the test system.

Title of the Project

VOLTAGE STABILITY ANALYSIS USING FIREFLY ALGORITHM

Project Members

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ABSTRACT

The problem of voltage stability is one of the main concerns in the operation of power systems. Many approaches have been used to estimate the voltage stability limit. One of the approaches is determining the maximum loading point of the system. In this approach, the margin from the current operating point to the maximum loading point of the system is determined. Finding this maximum loading point can be formulated as an optimization problem. The newly developed Differential Evolution (DE) algorithm has the main advantages of faster convergence, simple with regard to application and modification and requires a few control parameters. DE has the disadvantages of premature convergence and inability to recollect the best values. This project utilizes Firefly Algorithm (FA) for determining the maximum loadability limit of power systems. Details of the implementation of the proposed method to two test systems sample six bus and IEEE 30 bus are presented. The results are compared to those obtained by and DE. Good agreement has been obtained proving the validity and applicability of the proposed method.

Title of the Project

AUTOMATIC LOAD CONTROL WITH RESPECT TO POWER GENERATION USING PIC MICROCONTROLLER

Project Members

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ABSTRACT

In this work, the ability of smart meters to control domestic demand during system emergencies is investigated. The load is controlled by disconnecting the loads based on the maximum demand. In the existing method, the loads are periodically disconnected zone by zone. In this proposed method, the power is maintained equally in all the zones. In all the zones, the minimum load is connected during whole day. Based on the power generation the load is disconnected by using relay. The energy meter system with embedded controllers such as ZigBee to transmit the data over the radio signals. In real time systems, the ZigBee communication device can also be used to transmit the data from substation to each home.

Title of the Project

MODELLING AND SIMULATION OF PMBLDC MOTOR AND ITS POSITION CONTROL USING NEURAL NETWORK

Project Members

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ABSTRACT

Brushless DC Motor (BLDC) is one of the best electrical drives that have increasing popularity, due to their high efficiency, reliability, good dynamic response and very low maintenance. Due to the increasing demand for compact & reliable motors and the evolution of low cost power semiconductor switches and permanent magnet (PM) materials, Brushless DC motors become popular in every application from home appliances to aerospace industry. The conventional techniques for controlling the stator phase current in a brushless DC drive are practically effective in low speed and cannot reduce the commutation torque ripple in high speed range.

This paper presents the Neural Network for position control of BLDC motor. The output of the **Neural Network** is directly fed as the input to the current controller. The mathematical modeling of BLDC motor is also presented. The BLDC motor is fed from the inverter where the rotor position is the input and phase voltage sequence is the output. The complete mathematical model of the proposed drive system is developed and simulated by using **MATLAB/ Simulink** software. The Operation principle of using component is analyzed and the simulation results are presented in this to verify the theoretical analysis.

Title of the Project

MINIMIZATION OF NO-LOAD LOSSES OF THREE PHASE INDUCTION MOTOR USING PASSIVE INFRARED SENSOR

Project Members

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ABSTRACT

With the rapid and sharp increase in the energy rates, energy conservation has taken an important place in the industrial sector. Energy conservation has benefits on both sides with respect to cost and energy consumption. This project suggests a cheaper and simpler way of circuit design that deals with the energy conservation in the industrial sector. Most of the Industries are equipped with induction motor and there is a considerable no-load operation under certain circumstances. These no-load losses of induction motor leads to increase in production cost in industries. Minimizing the no-load loss of 3-phase induction motor reduces the production cost. In order to reduce the no load losses we have designed a logic circuit with basic electronic devices and by using PIR sensor which is used to sense the load. It is designed using two PIR sensors and one logic circuit to control the switch on and switch off of the motor during the load and no-load condition respectively.

Title of the Project

INTELLIGENT ENERGY MANAGEMENT WITH PHOTO VOLTAIC SYSTEM USING MICROCONTROLLER

Project Members

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ABSTRACT

It is becoming increasingly popular in today's world, for anybody to have his or her very own renewable generator such as a residential-sized wind turbine or solar system. Many people choose to own these types of systems as a means of becoming less reliant on the grid and to shrink their carbon footprint. However, the initial cost of these systems often makes them hard to justify from an economic standpoint; in fact in many cases the initial investment is never recouped. It is possible, though, to better utilize the energy production of these systems so that the owner sees a faster return on investment by incorporating an energy storage device (ESD), as a medium through which these renewable resources are dispatched. Time of use (TOU) pricing is considered by many to be a key part of creating a more energy-efficient and renewable- energy-friendly grid. TOU pricing is also an integral part of the smart grid and is already available to customers of some electric utilities. With TOU pricing becoming a reality, intelligent dispatching systems that utilize energy storage devices (ESDs) to maximize the use of renewable resources, such as energy produced by small, customer owned wind generators and roof-top solar generators, and grid energy while determining the most economic dispatch schedule could play an important role for both the customer and the utility. The purpose of this work is to create an algorithm upon which these dispatching systems can be based.

Title of the Project

PERIPHERAL INTERFACE CONTROLLER BASED AUTOMATIC ROBOT FIRING ON INFILTRATORS

Project Members

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ABSTRACT

Secured borders-Secured Nation. A country which has its borders made by land faces major security threat from enemy infiltrations. The use of ultra modern techniques like concerting fencing, UAV and advanced imaging devices also fails to reduce the enemy infiltration. This project intends to stop the infiltrators with the help of a simple mechatronic robot. This robot has a nylon sensor shaft mounted with a infrared trans-receiver is placed in a gear disc coupled with dc motor drive scans/surveils the area for infiltrators. If the infrared signal is blocked by any infiltrators, the PIC microcontroller locks the position of the DC motor at the target and simultaneously energizes the solenoid wound on the guns trigger and shoots at the target. After finishing the full surveillance along 180^0 the sensor shaft returns again into the chassis (original position). The chassis is buried into the soil behind our LOC which provides visual stealth to the robot.

Title of the Project

ARM PROCESSOR CONTROLLED THYRISTOR BASED HARMONIC FILTER

Project Members

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ABSTRACT

In this world, everything and everyone depend on electricity. Today, the power requirement of the loads has even exceeded the power generated at the generating end. But even on this condition, the quality of the supplied power cannot be compromised; power must be supplied without reduction in 'Power Quality'. Various factors affect a system's power quality, the important one being 'Harmonics'. This project work focuses on a new and innovative technique to mitigate the current harmonics. Generally, Active filters produce moderate results in mitigating power system harmonics over a varying load profile while Passive filters show excellent results for a tuned harmonic order at a particular load. This proposed technique is to implement auto-tuning passive filter on the point of common coupling (PCC) over varying load profile by actively sensing the load profile and estimating the required filters to be attached to the PCC for effective mitigation of the harmonics produced by the non-linear loads. These harmonic filters are switched appropriately with the help of thyristor switches. The proposed work is to implement effective tuning of the harmonic filters based on the load's working conditions in accordance with a self-formulated efficient tuning algorithm that estimates the filter values necessary for harmonic mitigation. So, parameters such as voltage, current and power factor are sampled from the input signal. Based on the calculated value of the filter parameters, the best efficient filters available are automatically switched in order to mitigate the harmonics effectively.

Title of the Project

STUDY AND ANALYSIS OF MULTI-TAPPED TRANSFORMER BASED INVERTER

Project Members

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ABSTRACT

In Modern era, AC power is generated to meet out our power requirements but a backup protection is necessarily needed in the case of power failure. The recent consumer trends utilize battery backup and solar PV systems since they are the most economical solutions available to provide reliable power during power outages. But, the energy obtained from these backup systems is in the form of DC whereas our end users require AC to work. Hence, the DC energy needs to be converted into AC using inverter to suffice the loads' energy requirements. Therefore, a stepped wave inverter modified from that of conventional multilevel inverter called "Multi-tapped Transformer based Inverter" is to be designed. The objective of this proposed work is to design a cost effective inverter modified from that of a multilevel inverter for the purpose of study and analysis of the harmonic contents of the various waveforms obtained by varying the time period of each level at different stages with the use of potentiometers. The testing and validation of different waveform patterns is accomplished with the help of FLUKE 434 Power Quality Analyzer.

Title of the Project

PASSIVE FILTER DESIGN USING DIFFERENTIAL EVOLUTION PARTICLE SWARM OPTIMIZATION

Project Members

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ABSTRACT

Generation of harmonics and the extension of waveform pollution in power system networks are important problems faced by the power utilities. The increased use of nonlinear device in industry has resulted in direct increase of harmonic distortion in the industrial power system in recent years. The determination of the harmonic current distortion of a load is further complicated by the fact that the supply voltage waveform at the point of common coupling (PCC) is rarely a pure sinusoid. This paper proposes a novel and most efficient method to mitigate the power system harmonics without disconnecting any load from the network. The main advantage of the technique is that it is simple and very efficient in mitigating power system harmonics. This could be integrated into commercially available power quality instruments to help handle harmonic and power quality issues.

Title of the Project

DESIGN OF SHUNT ACTIVE FILTER USING CASCADE H-BRIDGE MULTILEVEL CONVERTER FOR HARMONIC MITIGATION

Project Members

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ABSTRACT

In this modern world the usage of non-linear loads such as computers, inverters, uninterrupted power supply etc, are becoming enormous. These non-linear loads cause harmonics, which is one of the power quality disturbances. It gives an alarming signal to power system and power engineers. The non-linear loads produce harmonics which contributes to poor power factor, unbalance, reactive power burden, etc. And all leading to low system efficiency. The vulnerability of equipment in automated processing industry leads to poor power quality which results in heavy losses. Hence harmonics are mitigated by using active power filter. This work proposes the modeling and control process of the single-phase cascade H-bridge multilevel converter used as a shunt active filter. Based on the obtained model, a controller is proposed to compensate for harmonics distortion and reactive power caused by a nonlinear load. In the proposed approach, the current reference has been selected to be a signal proportional to either the line voltage or to its fundamental component.

Title of the Project

DESIGN OF THREE PHASE RECTIFIER BASED ON SEPIC CONVERTER OPERATING IN DISCONTINUOUS CONDUCTION MODE

Project Members

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ABSTRACT

This project is to analysis and design and implementation of a three phase high power factor rectifier, based on the single-ended primary-inductance converter (SEPIC) operating in discontinuous conduction mode, with output voltage regulation and high frequency isolation. The input high power factor is naturally attained through the operational mode without the use of current sensors and a current control loop.

In this project, a three phase isolated high PF rectifier topology based on the DC–DC SEPIC operating in the DCM will be simulated. Theoretical analysis is studied, by summarizing the converter operation.

Experimental set up is developed for the conformation of results of the proposed topology operates with input sinusoidal currents, without current sensors or a control loop strategy for this purpose, leading to a cost reduction, simplicity, and robustness.

There are many possible applications for the proposed converter, including in telecommunications and three phase input based battery chargers. The MATLAB Simulink is used for the purpose of verifying the simulation results.

This project is implemented for D.C motor.

Title of the project

DESIGN AND IMPLEMENTATION OF SLIT-LAMP POWER SUPPLY BY USING SEPIC INTEGRATED KY CONVERTER

Project Members

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ABSTRACT

In Ophthalmology SLIT-LAMP make good role in diagnostics various problem in human eye. In SLIT-LAMP power supply is required to run the halogen bulb. The general supply is required 6V 20W with variable supply is used. Presently, DC-DC power supply is used in Buck-Boost. The regulation of power supply is not sufficient, the voltage stress, voltage ripple and more is to reduce. Hence owing to reduce limitation of SEPIC and KY Converter is used, which greatly improved the performance and measurement. It analyzes and describes step by step process of designing, feedback control and simulation of novel voltage SEPIC and KY converter to supply. Both the SEPIC and KY converter combined to supply the SLIT-LAMP and halogen bulb. Thus it makes the circuit to be compact and efficient. The Simulation has been done with MATLAB/SIMULINK. A prototype is designed using current and voltage sensors and control is implemented. It is proposed to drive 12V, 20W Halogen Bulb is used. The hardware implementation is tested the clinic for proving the result.

Title of the project

ASSESSMENT OF AVAILABLE TRANSFER CAPABILITY FOR MADURAI UTILITY SYSTEM

Project Members

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ABSTRACT

Nowadays the power demand is increasing due to human sophisticated life. The power balancing between generation and demand is very critical. So, we are taking a Madurai utility system for this problem solving. Calculate the total power for **"MADURAI"** utility system by using the Newton raphson power flow method and to calculate the "**TOTAL TRANSFER CAPABILITY" (**TTC), and the "**AVAILABLE TRANSFER CAPABILITY"** (ATC) by using the power world simulator tool. Calculate the total load connected to that system and how much amount of power to be delivered that load. Calculate the total power carrying capacity of that system. From these data, we will calculate yet how much load can be loading that system. From this analysis we will increase the (ATC) demand of Madurai utility system without affecting the system, and modifying the system configuration. If powers will not enough to deliver load, we can get the remaining power from other utilities.

Title of the project

DESIGN OF FRACTIONAL ORDER PI CONTROLLER FOR SPEED CONTROL OF BLDC MOTOR

Project Members

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ABSTRACT

Proportional Integral controller is one of the most widely used controllers in industry, but the recent advancement in fractional calculus has introduced applications of fractional order calculus in control theory. One of the prime applications of fractional order calculus is fractional order Proportional Integral Controller and it has received a considerable attention in academic studies and in industrial applications. FOPI controller is an advancement of classical integer order PI controller, it is also known as non-integer order PI controller. In many a cases fractional order PI controller has outperformed classical integer order PI controller. The proposed work deals with optimal tuning of a Fractional Order Proportional-Integral controller for speed control of a Brushless DC motor. Brushless DC motors (BLDC) have some advantages over conventional brushed DC motors, which are mainly better speed versus torque characteristics, high efficiency, high dynamic response, long operating life, noiseless operation higher speed ranges, and low maintenance. The controller models are implemented in the MATLAB/SIMULINK. A comparative study of classical PI controller and fractional order PI controller has been performed.

Title of the project

POWER SYSTEM VOLTAGE STABILITY ANALYSIS USING MODIFIED HARMONY SEARCH ALGORITHM

Project Members

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ABSTRACT

Determination of voltage stability limit at various operating condition is essential to ensure the power system operation. Determination of voltage stability is obtained by identifying the stability margin. This stability margin is the distance between the current operating point of the system and the maximum loading point of the system. In general, the maximum loading point is more important than the true voltage collapse point because the maximum of power system loading is achieved at this point. The main objective of this project is to improve the maximum loadability limit of the system using Modified Harmony Search (MHS) algorithm. The test systems considered here are 6 WW bus and IEEE 30 bus system. The result obtained from Modified Harmony Search (MHS) algorithm has been compared with Continuation Power Flow (CPF) algorithm and Harmony search (HS) algorithm.

Title of the project

VOLTAGE STABILITY IMPROVEMENT IN WIND TURBINE USING SVC

Project Members

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ABSTRACT

This project presents the impacts of wind power penetration on the operation of a power system. Continuation power flow (CPF) is performed on the system without wind power, with wind power and svc added wind power. The modelled wind turbine is connected to any of the generator bus. Voltage stability for the power system is determined by the corresponding PV curves for each bus with and without SVC added wind power .The maximum output was obtained using Continuation power flow (CPF) method. Voltage collapse was found to occur at higher loading factor which enhances the voltage stability of the system. Finally, the steady state bus voltage became higher.

Title of the project

POWER QUALITY IMPROVEMENT USING UNIFIED POWER QUALITY CONDITIONER

Project Members

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ABSTRACT

The use of power electronic devices in these modern days has caused lot of disturbances in voltage waveforms. The disturbance includes Voltage sag/ swell, flicker, interruption etc. For this purpose we are using custom power devices to compensate and mitigate such disturbances. Unified Power Quality Conditioner (UPQC) can provide the most efficient solution for mitigation of voltage disturbances in distribution system. This paper analyzes the key issues in the Power Quality problems. As one of the prominent power quality problems, the origin, consequences and mitigation techniques of voltage sag, interruptions problem has been discussed in detail. The study describes the techniques of mitigating voltage sag and interruptions in a distribution system by a custom power device - Unified power quality Conditioner with dq0 based PI controller technique. UPQC is a compensating device connected between the supply and the load. It consists of two voltage source inverters connected back to back using a common DC capacitor. It consists of series and shunt active power filters. It detects the voltage and current disturbances and injects the required power to protect sensitive load against disturbances. Here in this paper, dq0 based PI controller is employed for the mitigation of three phase Voltage Sag and interruption in the distribution system using UPQC. The simulation results show that the performance of dq0 based PI controller delivers fast performance when compared with the conventional PI controller.

Title of the project

DC-AC ELEVEN LEVEL CASCADED H-BRIDGE MULTILEVEL INVERTER FOR HIGH POWER APPLICATIONS

Project Members

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ABSTRACT

This project presents a cascaded H-bridge multilevel boost inverter for High power applications implemented without the use of inductors. Currently available power inverter systems for High power applications use a dc–dc boost converter to boost the output voltage for a traditional inverter. It has expensive and low efficiency because they need a bulky inductor. A simple control strategy is applied for switching the switches with suitable delays. The multilevel inverters are used to reduce the harmonics. The inverter with large number of steps can generate high quality voltage waveforms. The simulation of single phase eleven inverter is done in MATLAB. The speed characteristic of capacitor start-run induction motor is simulated. The FFT for the output are compared and presented to validate the proposed control strategy.

Title of the project

NOISE MITIGATION IN FLYBACK DC-DC CONVERTER USING RRRM SCHEME

Project Members

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ABSTRACT

Switching power converters have been reported to generate common-mode and differential-mode conducted noises in addition to radiated noise. Thus, it is necessary to find a mitigation technique to overcome this problem. Common methods for EMI suppression are related to the use of filters and shielding techniques. However, these tools are bulky and require expensive passive components, which make them unsuitable for space-limited and price-sensitive portable devices. The switching noise produced by Fly-back DC–DC converters reduced using RRRM scheme and also this RRRM scheme implemented in MICROGRID application. The entire system has been simulated using MATLAB/SIMULINK.

Title of the project

SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM FOR DC MOTOR CONTROL

Project Members

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ABSTRACT

In any kind of industries motors are important machine. They are used in conveyor control, pumping actions, cooling purposes, power generations and many other processes. So, the situation is need for monitoring and controlling the motors. Protection of Motors has become challenging task in industries**.** Mostly the SCADA system is used in the generation and the transmission line. In our project we are going to monitor and control the parameters of DC motor using SCADA software. Many kind of fault which can be frequently occur in DC motor such as short circuit &open circuit winding fault, speed varying, temperature increasing, and over vibration. The winding fault can be detected by voltage measurement technique. If the voltage of the DC Motor will be increasing, the field winding and armature winding of the motor fails. The motor temperature will increase when motor is continuously in run condition. Temperature sensor is used to monitor the temperature. If the motor speed increases the prescribed limit, the motor losses its mechanical strength and vibration occurs to a great level. The advantage in this project is, the mentioned faults are given alert to control room by SCADA, and the faults are rectified.

Title of the project

AN ACTIVE SHUNT DIVERTER FOR AN ON-LOAD TAPCHANGER BY USING EMBEDDED SYSTEM

Project Members

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ABSTRACT

This project is focused to present an active shunt diverter design for on-load tap changers. For the existing distribution network voltage control mechanisms, which rely on mechanical on-load tap-changers (OLTCs), were designed for the slow adjustment of gradual demand changes over a daily cycle which causes arcing problem in the switch contacts. To overcome this drawback our project design uses an "active-shunt diverter" instead of mechanical switches. Here we use active shunt current diversion principle in the tap change operation where the active device is required to conduct the load current. Thus the current in the switch path is made to zero and the arc less operation of the switch is ensured. OLTC designs containing semiconductor devices which have the advantage to reduce the degree of arcing and possible to provide fast and accurate voltage control. Active shunt devices potentially offer excellent efficiency and electrical robustness due to the elimination of continuously conducting semiconductor devices in the load current path. Thus the OLTC design is presented where semiconductor devices are used to perform current commutation which leads to entirely arc less operation.

Title of the project

MODELLING AND SIMULATION OF STATIC VAR COMPENSATOR USING FUZZY LOGIC CONTROLLER FOR POWER FACTOR CORRECTION

Project Members

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ABSTRACT

The Static VAR Compensator (SVC) is one of the FACTS devices in shunt connection which can be used for power factor correction. The project investigates a modern approach for SVC control using fuzzy logic based controller. The simulations and effects of shunt compensation in order to improve power factor is presented. The SVC modeled in the project is a TCR-FC type with two components: the Thyristor Controlled Reactor (TCR) and the Fixed Capacitor (FC). The performances of fuzzy based control of the SVC are compared with a conventional PI Controller and the advantages of modern control to offer significant correction in power factor for inductive loads are highlighted. MATLAB Simulink environment is used for system modeling and simulations.

Title of the project

PROTECTION OF TRANSFORMER USING BACK PROPAGATION NEURAL NETWORK

Project Members

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ABSTRACT

In a power system, transformers and other electrical equipment need to be protected not only from short circuit, but also from abnormal operating conditions, such as over loading, and different fault protection. The increased growth in power systems both in size and complexity has brought the need for fast and reliable protection scheme for major equipments like transformer. The power transformer protective relay should block the tripping during magnetizing inrush and rapidly initiate the tripping during internal faults. In this paper, First we review the concept of the magnetizing inrush current and over- excitation phenomena as they belongs to the causes of male-operation. Many methods have been used to discriminate magnetizing inrush from internal faults in power transformers. Most of them follow a deterministic approach, i.e. they rely on an index and fixed threshold. This article proposes for Identification of Inrush Current & Internal Fault Current of power transformer for proper protection scheme. In the proposed algorithm, is Feed Forward Back Propagation Network (BPN) are used as a classifier and address the challenging task of detecting magnetizing inrush from internal fault. The algorithm is evaluated using simulation performed with MATLAB. The results confirm that the FFBPN is faster, stable and more reliable recognition of transformer inrush and internal fault condition.

Title of the project

MULTI SENSOR RAILWAY TRACK GEOMETRY SURVEYING SYSTEM

Project members

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ABSTRACT

The project describes an Obstacle Detection system that ensures safety and efficiency on railways. Here a system for obstacle detection and train location estimation is proposed. The system consists of a microcontroller which is interfaced with the GPS module, GSM modem, and an Obstacle detection sensor once the sensor senses the obstacle the controller will send the GPS co ordinates through GSM Modem to the control centre and RF transmitter will transmit the data to the train section. When the RF Receiver of train Section receives the signal, alarm will be triggered and a DC motor interfaced with the train will stop running to indicate that train has stopped. LCD unit in the train will display the obstacle alert message.

Title of the project

ECONOMIC DISPATCH USING TEACHING LEARNING ALGORITHM

Project Members

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ABSTRACT

"The Economic dispatch is the operation of generation facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities". The main objective of the economic dispatch problem is to minimize the total fuel cost in generating units, considering various equality and inequality constraints. In this work a new algorithm called "TEACHING LEARNING ALGORITHM" is proposed. This algorithm works on the effect of influence of a teacher on learners. Teaching Learning Based Optimization (TLBO) is a population-based method and uses a population of solutions to proceed to the global solution. The proposed method has been employed on IEEE 30 bus system and 6WW bus system to validate this algorithm. The results obtained shows the efficiency of proposed algorithm and the results has been compared with other technologies already available in the literature.

Title of the project

MULTI OBJECTIVE OPTIMIZATION USING FIREFLY ALGORITHM

Project Members

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ABSTRACT

Optimal power flow (OPF) is the major task in power system economics and operation. Real power outputs from the generators of a power system are so adjusted that the total production cost is minimum. Real power output from generators, generator bus voltages and transformer tap settings are controlled for optimizing the total fuel cost in this OPF problem. In this work the OPF problem is considered as multi-objective function for minimizing total fuel cost and transmission losses satisfying various equality and inequality constraints. The approach employs a nature inspired meta heuristic optimization algorithm called Firefly Algorithm (FA)to determine the optimal settings of control variables. The proposed algorithm is simple, with less number of parameters and easy to implement. The performance of this algorithm in OPF is tested on IEEE-30 bus test system. Numerical results show that the proposed algorithm outperforms the other recently developed algorithms. The result demonstrates the potential of the FA shows its effectiveness and robustness to solve the OPF problem.

DESIGN AND IMPLEMENTATION OF MULTILEVEL INVERTER FOR SOLAR ENERGY SOURCES WITH MPPT CONTROLLER

Project Members

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ABSTRACT

This project is to design and implement a single-phase seven level PV inverter topology. Multilevel inverter can be implemented in this project is used to attain a smooth sine wave voltage. The proposed method is implemented in solar energy systems. Maximum Power Point Tracking (MPPT) is implemented in solar array power system with direct control method. The incremental conductance algorithm is used to track the MPP, as it has better performance to control under rapidly changing atmospheric condition. Battery is fixed to store excess energy and supply during the demand. The Total Harmonic Distortion (THD) produced by the inverter is reduced. In this project, a multilevel inverter for solar energy sources with MPPT controller will be simulated. Theoretical analysis is studied, by summarizing the inverter operation. Experimental set up is developed for the conformation of results towards attainment of a smooth sine wave voltage, maximum power, high efficiency, simplicity, and robustness.

Title of the project

XBEE BASED REMOTE MONITORING OF TRANSFORMER HEALTH

Project Members

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ABSTRACT

The main aim of the project is to acquire data of distribution transformers remotely by GSM modem or XBEE. For this real-time scenario we can take one temperature sensor, one potential transformer and one current transformer for monitoring these 3 data of the transformer and then send the same to a remote location. 3 analog values are taken in multiplexing mode connected to a programmable microcontroller of 8051 family through an IC ADC 0808. Then the values of all the sensors are sent sequentially as per the frequency of multiplexing of the ADC by Microcontroller.

They are then sent directly to RF module operating at 2.4 GHz for transmitting the same data. Remote receiver is also a microcontroller based unit that receives not only the real time data but also the error signal along with to operate corresponding relay for any action with LCD display. These days, the electricity department has to send employees for taking meter readings every month. This project provides a convenient and efficient method to avoid this problem. The Microcontroller takes the reading from the meter and displays the reading on LCD. By using the MATLAB simulation we can perform the Calculation of Transformer referred to primary and referred to secondary for Exact and Approximate Models.

Title of the project

TWO WAY COMMUNICATIONS IN POWER SYSTEM OVER HEAD LINES

Project Members

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ABSTRACT

In recent day's most of the improvement in communication is not shown in wired line communication network because of the absence of mobility and addition work of laying a wire system leads to additional cost. In order to overcome this problem the existing power lines are used for making communication. The purpose of this paper is to give a complete model of a power-line communication system on a distribution network in overhead lines with modulated data is done. Overhead line configuration is considered together with coupling transformer. A special chip for power line communicator "BCM60321" is used in the proposed system to add additional enhancement to the system. The duplex mode is applied on both sides with transmitter and receiver coupled with energy meter to make the entire system versatile. Thus by means of our proposed system the existing communication problem may be rectified.

Title of the project

VOLTAGE REGULATION OF POSITIVE BUCK-BOOST DC-DC CONVERTER

Project Members

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ABSTRACT

This work presents a high-efficiency positive buck-boost converter with mode select circuits and negative feed-back techniques. Four power transistors produce more conduction and more switching losses when the positive buck–boost converter operates in buck–boost mode. Utilizing the mode select circuit, the proposed converter can decrease the loss of switches and let the positive buck–boost converter operate in buck, buck–boost, or boost mode. By adding Negative feedback techniques, the proposed converter can improve transient response when the supply voltages are changed. The proposed converter the output voltage is 3.3 V, and the regulated supply voltage range is from 2.5–5 V. Its switching frequency is 50 kHz. The controller models are implemented in the MATLAB/SIMULINK. A study of classical PI controller has been performed.

Title of the project

PWM BASED MICROSTEPPING CONTROL USING DISTURBANCE OBSERVER OF STEPPER MOTOR

Project members

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ABSTRACT

It is well known that commercial hybrid stepper system has one or more low-speed resonant points. However, this characteristic cannot be accurately modeled without high-order equations or complicated measurement of motor parameters. In this paper, a novel approach is proposed to model the behavior of a commercial 1.8° hybrid stepper motor accurately and efficiently. Also, model-based damping algorithms for both open-loop control and servo control are proposed. Simulation and experimental results show that the proposed algorithms can effectively eliminate low-speed resonance and vibration of the stepper system.

It is quite unexpected that the first and second harmonic torque ripples contribute significantly to low-speed resonance, while the effect of the higher order harmonics is relatively weak. Model-based compensation of the low-order torque ripple is proven to be effective to remove vibration and resonance.